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CONTENTS—JANUARY, 1951

Dr. Herbert Acuff, F.A.C.S., F.I.C.S., D.I.B.S., Knoxville, Tennessee 1
President, International College of Surgeons (Portrait)

Prof. Dr. Hans Finsterer, F.R.C.S. (Eng.), F.I.C.S. (Hon.), Vienna, Austria 2
President-Elect, International College of Surgeons (Portrait)

Officers of the International College of Surgeons 3

Officers of the United States Chapter, International College of Surgeons 4

Dr. Henry W. Meyerding, F.A.C.S., F.I.C.S., D.I.B.S., Rochester, Minnesota 5
President, United States Chapter, International College of Surgeons (Portrait)

Dr. William R. Lovelace, F.I.C.S., D.A.B.S., D.I.B.S., Albuquerque, New Mexico 6
President-Elect, United States Chapter, International College of Surgeons (Portrait)

Treatment of Cancer of the Lip 7
James W. Hendrick, M.D., San Antonio, and Grant E. Ward, M.D., Baltimore

Ectopic Pregnancy 28
Gilbert F. Douglas, M.D., F.A.C.S., F.I.C.S., George Capers Douglas, B.S., M.D., and Gilbert F. Douglas, Jr., B.S., M.D., Birmingham, Alabama

Inguinal Hernia: A New Surgical Treatment 38
André Heffez, M.D., Cairo, Egypt

Lag Screw Fixation of Femoral Neck Fractures 44
Joseph S. Lundholm, M.S., F.A.C.S., F.I.C.S., Rockford, Illinois

Conduction Anesthesia in Control of Obstetric Pain and Management of Cesarean Sections..... 50
C. E. James, M.D., F.A.C.S., F.I.C.S.; Carey G. Bringle, M.D., A.I.C.S.; Albert E. Laughlin, M.D.; and R. A. Hingson, M.D., F.A.C.S., F.I.C.S., Memphis, Tennessee

Vaginal Hysterectomy in the Aged..... 57
Ernest F. Cadenhead, M.D., F.I.C.S., Brownwood, Texas

Plastic Surgery of the Nose and Chin..... 62
Lester W. Eisenstodt, M.A., M.D., F.I.C.S., Newark, New Jersey

The Uses of Refrigeration in Surgery..... 76
Lyman Weeks Crossman, M.D., F.A.C.S., F.I.C.S., Baytown, Texas

CASE REPORT

Operative Excision of Giant Panniculus Adiposus..... 85
James A. Jackson, M.D., F.A.C.S., F.I.C.S., and John R. Steeper, M.D., Madison, Wisconsin

NEW INSTRUMENTS

New Anatomic Rings..... 89
Pedro D. Curutchet, M.D., F.I.C.S., Buenos Aires

SECCION EN ESPANOL

Un Nuevo Método de Prevenir el Émbolo Mortal..... 92
Harry H. McCarthy, M.D., F.I.C.S., Louis D. McGuire, M.D., F.I.C.S., Arthur C. Johnson, M.D., F.A.C.S., and John W. Gatewood, M.D., Omaha, Nebraska

EDITORIAL

Membership in the United States Chapter, International College of Surgeons..... 95

NEW HORIZONS

On Being Shelved..... 98

CHAPTER NEWS 99

NEW BOOKS 102

ABSTRACTS FROM CURRENT LITERATURE..... 104

ARMAMENTARIUM 107

IN MEMORIAM 108

HOME OF THE INTERNATIONAL COLLEGE OF SURGEONS AND THE UNITED STATES CHAPTER..... 109

CALENDAR OF MEETINGS..... 110

Dr. Herbert Acuff, F.A.C.S., F.I.C.S., D.I.B.S.
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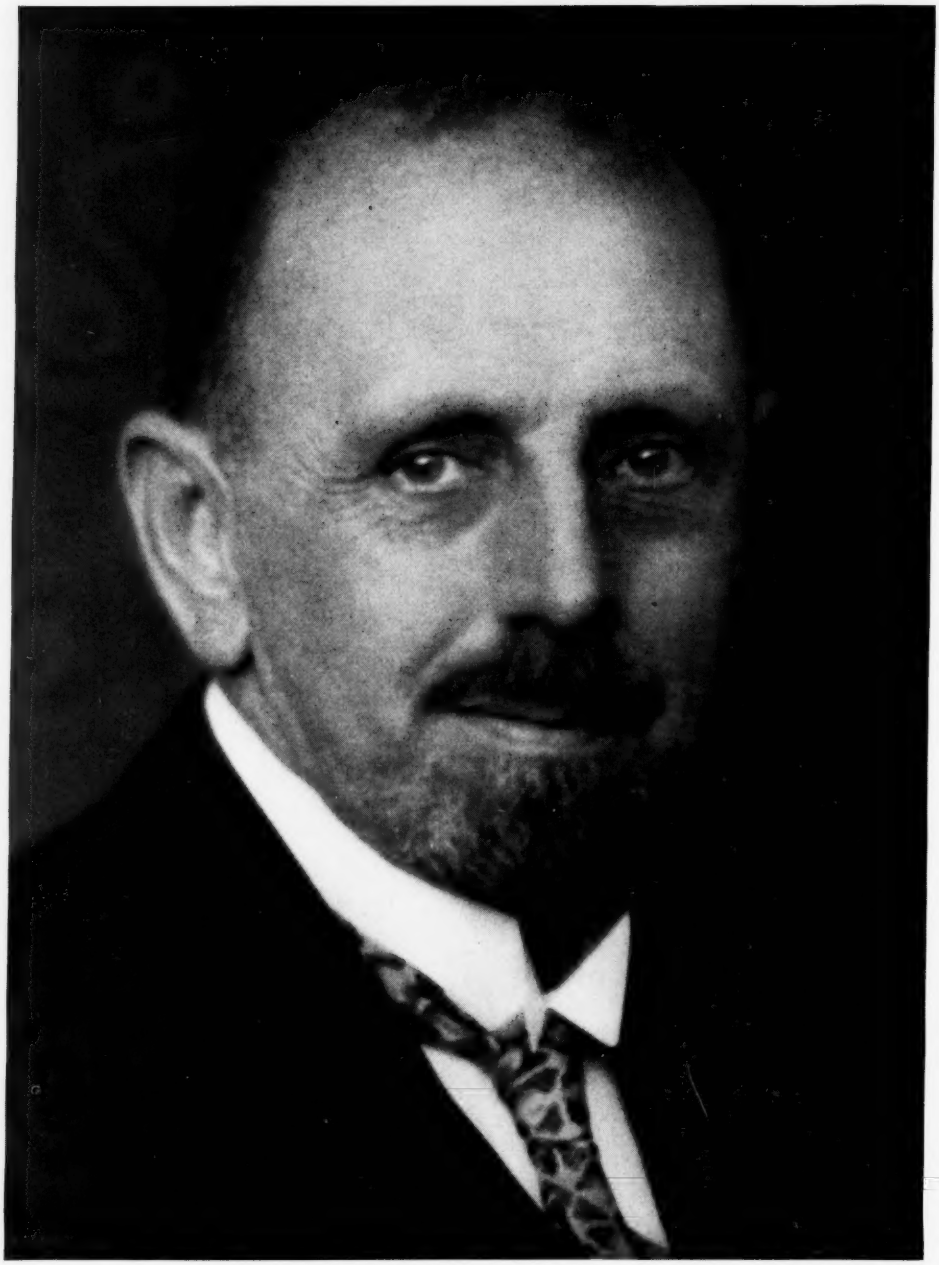

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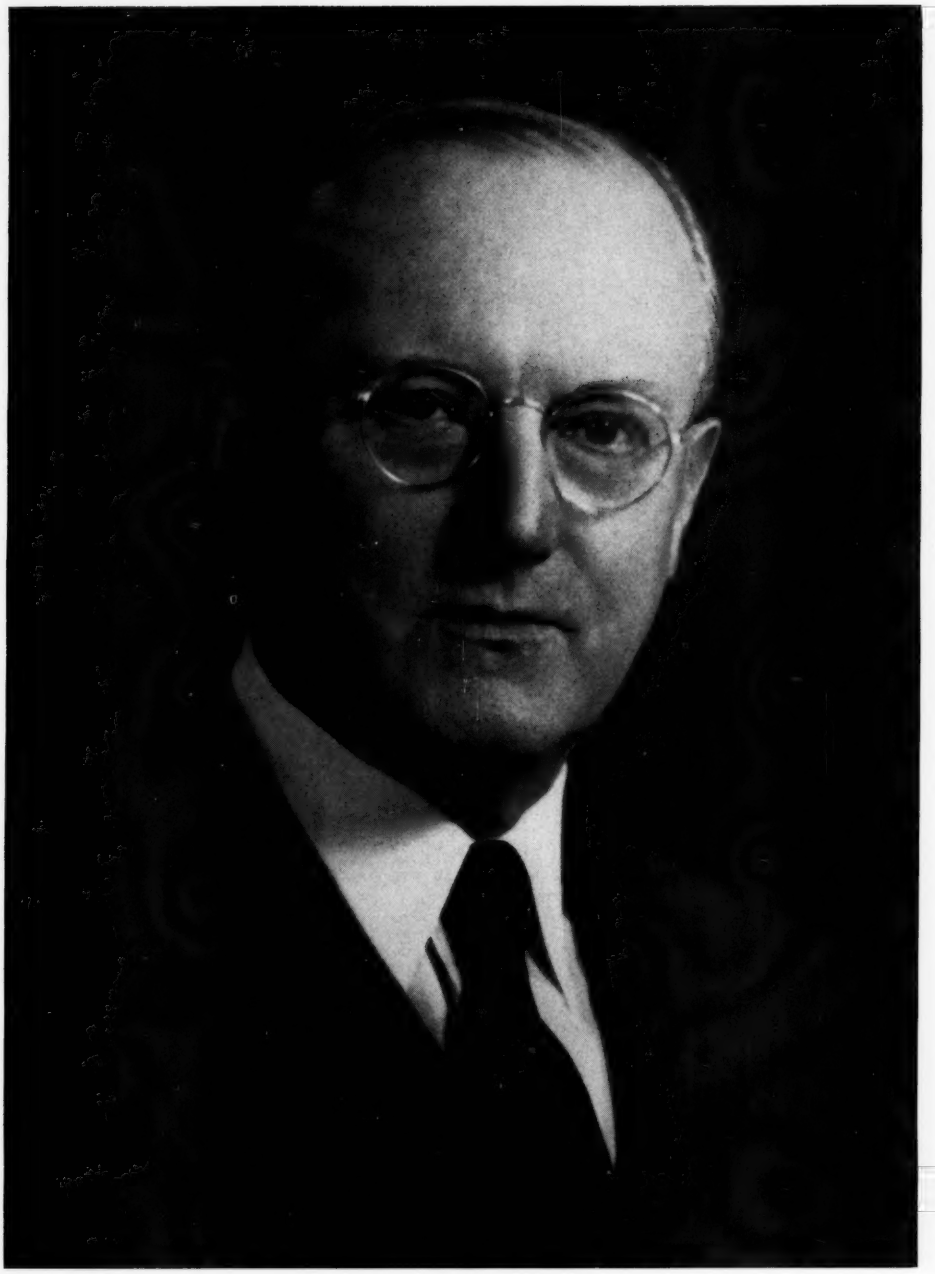

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Original Articles

Treatment of Cancer of the Lip

JAMES W. HENDRICK, M.D.
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AND
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CANCER of the lip accounts for approximately 2.3 per cent of all cancers.[1] Owing to its accessibility, cancer in this location should be diagnosed early and appropriately treated. It is surprising, however, how frequently intelligent patients permit cancer of the lip to develop extensively and remain untreated for long periods in spite of the fact that the lesion must certainly be observed several times each day. All too frequently the patient's physician[2] does not recognize the seriousness of the lesion and therefore shares the responsibility of delay in treatment; far too often he only administers ineffectual pastes, escharotics, ointments, small doses of radium or roentgen irradiation or light electrodesiccation, which merely serve to stimulate the cancer to more rapid growth and earlier metastasis.

From the Departments of Surgery, Johns Hopkins University School of Medicine, the School of Medicine of the University of Maryland and the private practice of the authors.

Read at the Fifteenth Annual Assembly of the United States Chapter, International College of Surgeons, Cleveland, November 1950.
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The lower lip is the site of this malignant lesion in about 95 per cent of cases. The disease is practically limited to the male[3]; only 4 per cent of the patients in this group were female. Negroes are seldom affected.

Incidence and Etiologic Factors.—The mucous membrane of the lip, like the skin of the face and hands, is subject to the vicissitudes of weather and trauma. Cancer of the lip is most frequently encountered in persons who have thin, dry skin[4] and are much exposed to intense sunlight. In a study of 311 histologically proved labial cancers it was noted that 42 per cent of the patients had benign lesions before definite ulceration and induration began. These were warts, fissures, papillomas, scaly areas, cutaneous horns or keratoses, and had been present for periods varying from a few weeks to many months. In 22 per cent of cases there was a history of trauma prior to the appearance of the tumor. The injuries were due to such causes as wearing poorly fitting dentures, holding nails in the mouth, stabbing the lips with a fork while

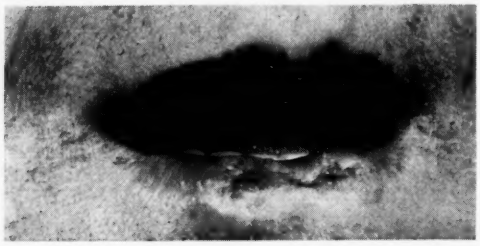

Fig. 1.—Squamous cell carcinoma, Grade I, developing in keratotic area involving almost the entire upper lip.

eating, cutting the lip while shaving, tooth extractions, cigarette burns, or the lesions of herpes. Formerly smoking was thought to act as a predisposing factor, but since about 80 per cent of the adult population smoke[5] and 30 per cent of the patients in this series did not smoke, this cannot be listed as a direct causative factor except in the case of a patient who held a pipe constantly in the same position.

Formerly syphilis also was listed as a causative factor[6]; in this group it was encountered no more frequently than in the general population.[7] Nine patients in this series were treated by their family physicians for syphilis until their labial cancers had grown extensively, and in 6 of these metastases had developed during treatment.

Anatomy, Histopathology and Lymphatics of the Lip.—Malignant tumors of the lip are of the squamous cell variety and originate on the mucous membrane of the vermilion border. Not infrequently basal and squamous cell epitheliomas are encountered which involve the skin of the lips and extend to the mucous membrane; but, strictly speaking, these are not lip cancers.

Carcinomas of the lip vary in histologic degree from the well differentiated Grade I to the highly anaplastic Grade IV. About 80 per cent are well differentiated and are either Grade I or Grade II. Therapeutic agents such as electrodesiccation, inadequate irradiation or escharotics, when used indiscreetly or in the presence of acute inflammatory conditions, increase the activity of the growth. This was shown by Figi and others[8] and has been substantiated by us on numerous occasions.[9] When such lesions are incompletely treated, growth increases markedly, with a greater likelihood of metastasis. It was observed in this, as well as in other groups of cases reported,[10] that cancers involving the commissures and the upper lip metastasize earlier, grow more rapidly and are more difficult to control.

The lymphatics of the lip were discussed in detail in previous reports.[11] A résumé will be given here. The lymphatics form a fine capillary network on the vermilion border[12] and combine into collecting trunks. The trunks from the lower lip pass to the mental, submental and submaxillary nodes. There is a free anastomosis across the midline which accounts for bilateral metastasis, especially from cancers located in the middle third of the lip. The lymphatics of the upper lip and the commissures pass to the preauricular, postauricular, intraparotid, submaxillary and submental nodes. It has been shown that the collecting trunks from the lateral third of the lower lip enter the mental foramen in 22 per cent of cases, accounting for early involvement of the mandible in some instances.

Any lesion on either lip which persists for six to eight weeks should be considered a cancer until proved otherwise. Thin-skinned persons who are subject to intense sunlight frequently have keratosis of the lower lip; in some cases the entire lower lip is involved. After varying periods one area of the keratosis will indurate, thicken and ulcerate, signifying malignant transformation. A cancerous ulcer that originates in keratosis develops, as a rule, very slowly and appears only slightly lower than the surrounding lip surface, but there is definitely a zone of induration beneath it. It is not uncommon to see a small, ulcerated lesion of this type, less than 1 cm. in diameter and 4 or 5 mm. deep, with an indolent appearance, which, on careful examination, will be found to have metastases to the lymph nodes.

Another type of cancer of the lip develops over a larger part of the lower lip at one time (Figs. 1 and 2). This type of tumor frequently begins in an area of chronic leukoplakia with induration beneath it, resulting in an ulcer[13] and occasionally extending over the entire lower lip; these ulcers are not very deep.

Occasionally leukoplakia occurs on the mucosal side of the lip, merging into keratosis

along the exposed vermilion border. Histologically the two processes, leukoplakia and keratosis, are the same; on the exposed, dry surface the thickened skin cracks and scales off; fissures often develop.

Such lesions as papillomas or cutaneous horns, when allowed to remain on the lip, after a variable interval become thickened and indurated around their edges; this signifies malignant transformation.[14] Not infrequently these cancers become large and bulky. Fortunately, tumors that grow away from the surface are much less malignant than those growing toward or into the body. It is not uncommon for large, bulky tumors of the lip to be present for considerable periods without metastases.[15]

Fissures on the lip, which frequently occur in the commissures, should be looked on with suspicion. Persistent fissures require surgical excision before malignant change takes place. Any ulcer or fissure with induration around the border, even though the growth is microscopic, should be examined by biopsy to determine whether malignancy is present.

One type of lip cancer develops rapidly. This usually begins as an indurated ulcer which spreads quickly, simulating inflammation. Within a few months the ulcer may destroy a large area of the lip and fix the lip to the periosteum of the mandible (Fig. 4, *A* and *B*). Such a tumor may be surrounded by an area of induration measuring 1 cm. or more and appearing inflamed. This indurated area contains cancer cells—an essential point to be recognized, since, to effect a cure, surgical removal of this indurated area of tissue or adequate roentgen irradiation of it is necessary.[16]

A small per cent of cancers of the lip with indurated margins that are well circumscribed, ulcerated and chronically inflamed may clinically simulate tuberculosis, syphilis or inflammatory ulceration. Histologic examination of adequate material will give the correct diagnosis.

The patients in this series of cases were divided into two groups: (*1*) those who had received no previous treatment before consulting our clinics (primary group) and (*2*) those

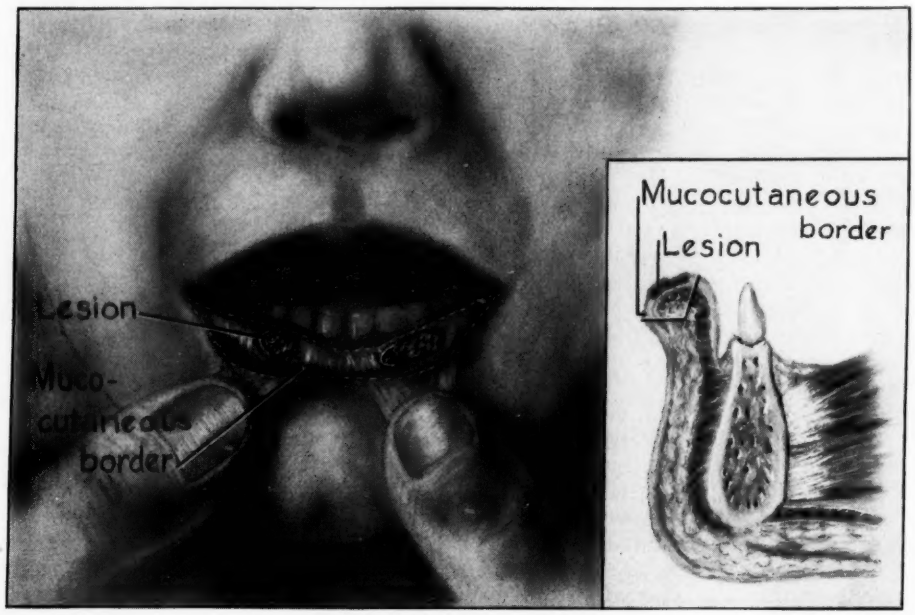

Fig. 2.—Artist's representation.

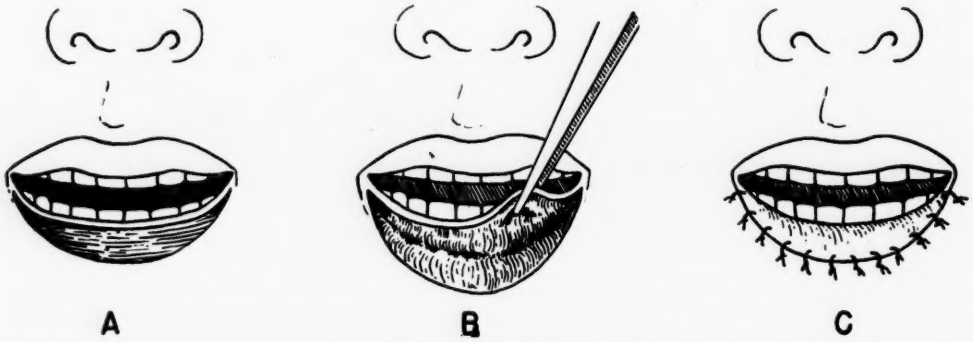

Fig. 3.—Surgical procedure advocated for excision of type of tumor in Figs. 1 and 2. Any remaining area of keratosis or leukoplakia is removed. The mucous membrane is advanced and sutured to the skin, giving a good cosmetic result and a low rate of recurrence.

who had received previous treatment for varying periods with cancer paste, radium, electrodesiccation or surgical excision (secondary group). Patients in the secondary group had lip lesions of much larger size and higher histologic grade than those in the primary group; they also showed a larger per cent of metastases to the lymph nodes of the neck.

Diagnosis.—The curability and cosmetic results depend entirely on early diagnosis and adequate treatment of the lip lesion and on whether metastases are present in the lymph nodes of the drainage area.[17] Cancers of the lip, because of their superficial location, favor early observation and lend themselves to easy examination. Premalignant lesions, such as papillomas, cutaneous horns, epithelial warts, keratosis, leukoplakia and chronic fissures, should be observed closely and removed before malignant transformation takes place.

It cannot be stressed too often that every tumor on the lips which has the appearance of a malignant growth, either proliferative or ulcerative, should be subjected to adequate biopsy. Unfortunately, it has been the policy of some clinicians to treat lip cancers, as well as tumors of the skin, with "a little radium" or "x-ray" without positive histologic examination. This approach is so unscientific that it should not even be discussed in scientific literature; but, because of the frequency of the practice, comment must be made. For example, if a tumor is benign and the patient receives a cancericidal dose of roentgen therapy, his lesion is being overtreated; on the other hand, if the lesion is malignant and the irradiation is given only for a benign lesion, the malignant tumor will continue its growth with increased rapidity.[18] The value of adequate biopsy outweighs any hypothetical danger of dissemination of the cancer or a poor cosmetic result. It must be stressed that adequate material should be taken for biopsy, since the pathologist can only pass on material submitted to him, and for this reason he must have tissue typical of the disease. The problem of biopsy is well illustrated by 97 cases in this series, in which the patients had received previous treatment elsewhere but in which only 27 biopsies had been done. In examining the lesion on the lip it is imperative to determine width, depth, the presence or absence of an indurated area around the lesion and the presence or absence of enlarged lymph nodes in the suprahyoid area.

We previously reported that approximately 40 per cent of normal persons will prove to have palpable lymph nodes in the suprahyoid space if this area is examined with diligence.[9] We demonstrated our routine method of palpating the lip lesion between the thumb and finger and the method of determining whether the lesion is plastered to the mandible and how far or how deep the induration is present around the lesion. The lymph drainage area is then carefully examined by having the finger

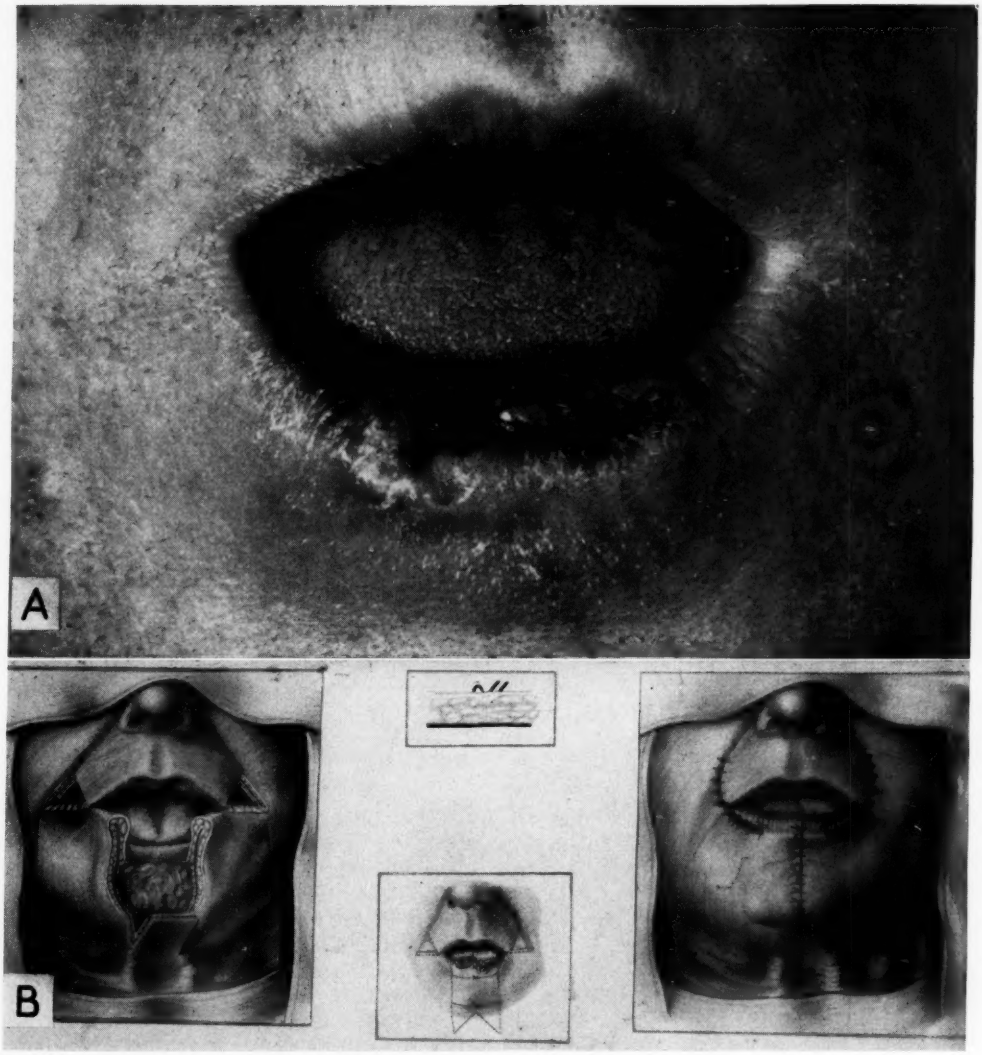

Fig. 4.—*A*, squamous cell carcinoma, Grade II, of short duration. There is an area of induration about 1 cm. on each side of the tumor and extending down almost to the chin. It is necessary to remove this area, which contains cancer cells. *B*, block excision of this type of tumor, with allowance of a wide margin around and beneath it. The mouth is made about 30 per cent smaller; the lips are pliable, and there is a good cosmetic result.

of one hand in the mouth and the fingers of the other hand beneath the chin and mandible; this permits the floor of the mouth to be palpated bimanually, starting in the midline and proceeding backward on each side while the patient flexes his head forward, thereby permitting the muscles in the suprahyoid area to become relaxed and allow accurate palpa-

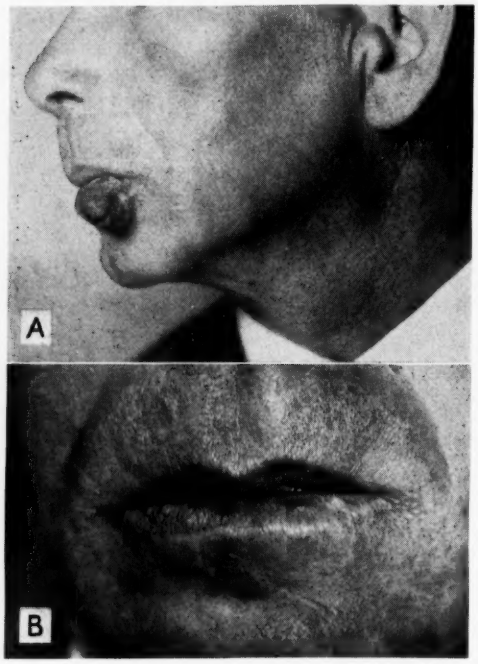

Fig. 5.—*A*, squamous cell carcinoma of the lateral third of the lower lip, 2.5 cm. in diameter. There are no palpable lymph nodes in the suprahyoid area. *B*, tumor treated with roentgen therapy (6,000 roentgens), with allowance of a good margin on each side. No recurrence after five years. (From Ward and Hendrick, *Tumors of the Head and Neck*. Reproduced by courtesy of the Williams and Wilkins Company, Baltimore.)

tion of the submarillary contents. If the cancer is located on the upper lip or in the commissures the preauricular, postauricular and interparotid regions should be examined in addition. After this maneuver the jugular chain of nodes should be examined from the angle of the jaw to the clavicle along the anterior border of the sternomastoid muscle.

Since the prognosis of labial cancer depends on accurate control of the primary lesion, whether the lymph nodes in the drainage area are involved and how promptly and effectively they are treated, it is important to determine, if possible, the presence of metastatic nodes.[19] In large ulcerative cancers of the lip the lymph nodes are frequently infected and may be enlarged as a result of metastatic inflammation from the lip lesion. Such nodes are tender and firm; they may be several centimeters in diameter, knotted together, painful and fixed. There may be evidence of inflammation, e.g., cutaneous erythema over the nodes. The mouth should also be examined to determine whether infection is present which may be producing inflammation in the lymph nodes.

If the cancer is located on the lateral third of the lower lip, roentgen examination of the mandible should be made to determine whether it is involved. Thirteen patients in this series had involvement of the mandible; 5 of these had a direct extension of the tumor to the mandible, and 8 had metastases through the mental foramen. One of the first signs of involvement of the mandible by metastasis is paresthesia of the lip and "toothache." When pressure is produced by palpating the mandible with one finger on its inner surface and the thumb on the outside, pain is elicited if the mandible is involved.

Treatment.—It is important to consider the following factors in planning therapy for cancer of the lip: (*1*) whether the patient has received previous treatment; (*2*) the size of the lesion (Table 2) and its histologic grade; (*3*) the age of the patient and his general physical condition; (*4*) whether there are metastases in the drainage area and whether they have extended to involve the jugular chain of nodes, and (*5*) whether there is involvement of the mandible. A large percentage of the primary tumors in this series that had received no previous treatment were well differentiated tumors of Grades I and II. The secondary group that had received previous treatment, such as inadequate irradiation, electrodesiccation or surgical excision, were of a higher histologic grade. Most Grade I and II lesions respond and are well controlled by either surgical exision or adequate irradiation. The Grade IX lesions metastasize early and probably are best managed with roentgen therapy to the primary lesion and suprahyoid dissections of the neck.

Treatment by Irradiation.—Roentgen therapy is a valuable modality in the treatment of cancers of the lip[20] under 1.5 cm. in diameter and not over 4 mm. in depth. It is especially valuable[21] for elderly patients in poor physical condition and for patients who refuse surgical

excision. However, it must be stressed that therapy is administered only after adequate biopsy and determination of the histologic grade of the tumor. We have successfully treated such lesions with 6,000 to 7,000 roentgens of unfiltered irradiation, including a margin of 1 cm. on each side of the growth.[22] The therapy is usually given in four to six sittings spaced at two-day to three-day intervals, a lead shield being used between the lip and the mandible to protect the teeth and the mandible (Fig. 5, *A* and *B*). In some instances, if it is impossible for the patient to be treated every second or third day for four treatments, the entire amount of irradiation can be given at one sitting; however, our results show that it is more beneficial to space the treatments.[9] Since cancer cells divide two to four times a day, depending on their cellular differentiation, it is our opinion that if the irradiation therapy is divided into several sessions, cells that are not destroyed by the first or second treatment will be destroyed subsequently. It usually requires three to four weeks for the reaction produced by adequate roentgen therapy to subside.

If the tumor has extended over 5 mm. in depth there is, as a rule, involvement of the orbicularis oris muscle.[23] If such a cancer is eradicated with roentgen therapy a defect results, necessitating plastic repair to prevent drooling of saliva. Neither is roentgen therapy as successful in eradicating smaller cancers of the upper lip or cancers located in the commissures as in disposing of those on the lower lip. It cannot be too frequently stressed that cancers must receive the entire amount of therapy in one series of treatments. Formerly, some roentgenologists spaced treatments from six to twelve weeks apart, but such ineffectual treatment only makes the cancer more resistant to irradiation.

In former years radium, in the form of placques, moulages, and radium tubes,[24] or the inhuman implantation of radium needles in the lips for several days at a time was employed, but this has now been discarded except, perhaps, in isolated areas where efficient roentgen therapy is disregarded. Del Regato[20b] stated in 1948 that "five years ago we discontinued the use of radium in our hospital in the treatment of cancer of the lip in favor of roentgen therapy." The same effects and better results can be obtained with roentgen therapy, when indicated, than with the use of radium in any of the aforementioned forms. Roentgen therapy may be administered with greater ease and more accurate dosage, without the risk of extensive infections and sloughs,[25] which frequently accompany radium therapy even with radium needles of low intensity. In addition, the mandible can be better protected with roentgen therapy, and the resulting scar is more pliable, softer and less likely to break down than are the scars remaining from radium therapy. The deleterious effects, from a cosmetic standpoint, and the cancers that persist after radium therapy probably are factors that cause many patients' reluctance to seek medical advice early for cancer of the lip. One need only see the large lip defects and destruction of the mandible resulting from radium therapy to be able to appreciate their point of view.

Fig. 6.—Squamous cell carcinoma, Grade II, involving one fourth of the lower lip, with no palpable lymph nodes in the drainage area.

Surgical Treatment: Cancers of histologic Grades I and II which do not involve more than one-fourth of the diameter of either lip and do not infiltrate the lip deeper than 1 or 1.5 cm. are eradicated by a V-shaped surgical

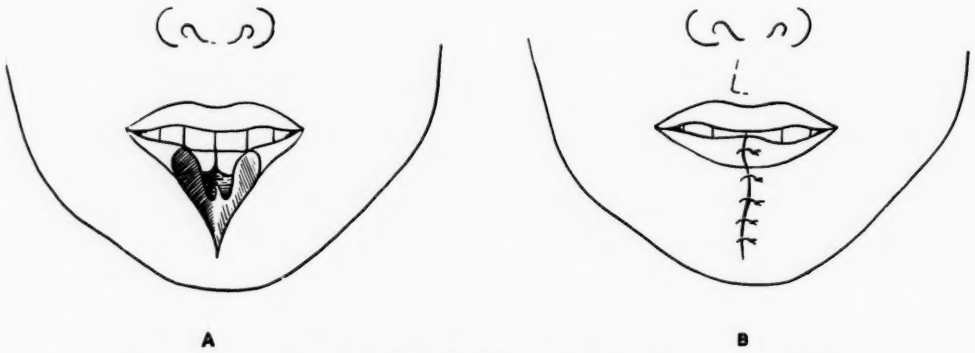

Fig. 7.—V-shaped surgical excision, of tumor in Figure 6, with wide margin around the tumor.

excision (Figs. 6, 7 and 8). A safe margin of at least 0.5 to 1 cm. is allowed around and beneath the tumor, especially if the tissues immediately surrounding it are indurated.[18a] If care is used in suturing the mucocutaneous junction of each side accurately, there will be good cosmetic results. This type of procedure may be carried out with infiltration anesthesia in a minor operating room.

Another group of cancers of the lower lip that have origin in keratosis or leukoplakia, which extend to involve most of the diameter of the lip and do not infiltrate over 4 or 5 mm. in depth, can be eradicated by excision of the lesion. A margin should be allowed on each side and beneath it (Figs. 1 and 2). The mucous membrane is advanced from the inner surface of the lip and resutured to the skin to form a new mucocutaneous junction.[26] Thus, not only the tumor but any part of the vermilion border that might later become involved in a malignant process is removed. This procedure and the V-shaped excision give excellent cosmetic results and do not change the contour, appearance or width of the oral fissure.

Lesions of the upper lip that are 1.5 to 2 cm. in diameter and 1 cm. deep are best removed by the Abbey technic[9] (Figs. 9, 10 and 11). A V-shaped excision, with a wide margin on each side and beneath the tumor, is made with the region under infiltration anesthesia. Since the upper lip is relatively smaller than the lower, the sacrifice of too much tissue may leave it too narrow. In this case a V-shaped flap is made in the lower lip opposite the area in the upper lip where the tumor was removed; this flap is left unattached on one side, with a good margin, and sutured into the defect in the upper lip. The lips are held together for ten days, during which time the patient is permitted a high-concentrate liquid diet. At the end of this time the flap is severed from the lower lip and any adjustment of it is made. Good cosmetic results are obtained with this procedure.

Large cancers of the lateral third of the lower lip, if removed with a wide margin, leave a marked defect; however, these can be safely removed by excising the lesion with a good margin of tissue on each side and beneath it and bringing down a full-thickness flap from the upper lip. This technic was described in a previous report.[11] The operative side is left shorter, but this is necessary in order to remove these large cancers and is safe because it permits adequate removal of the local lesion. The cosmetic results are relatively satisfactory.

Tumors of the lower lip that involve one half of the lip and extend in depth to the chin are removed as shown in Figure 4, *A* and *B*. A rectangular defect is left. To correct this, a small triangle of tissue is removed from each side of the upper lip, and the mucous membrane of the lower edge of this defect is brought out and sutured to the skin to re-form a vermilion border. These triangles are closed in layers with No. 0 catgut in the submucosa

and muscular layers and with interrupted black silk in the skin. The rectangular defect in the lower lip is closed by removing a small triangle from each side of the chin, converting the rectangular defect into a triangular one. This technic is very useful for these larger lesions; the cosmetic results are satisfactory; the orbicularis oris muscle remains intact; the mouth is made about 30 per cent smaller, and the lips remain flexible.

Large lesions of the upper lip resulting either from lip cancer or cancer of the skin of the upper lip in which half of the lip is involved and which infiltrates a large area may be corrected by the technic of Denonvilliers or the Davis-Ivy procedure. Perhaps the Denonvilliers technic (Figs. 12 and 13) is preferable. The tumor is excised with a wide margin; vertical flaps are made through the full thickness of the cheek on each side, with a pedicle below. The external incision of the flap extends from the level of the ala of the nose to the lower border of the mandible. Transverse incisions are extended from the upper border of the defect to meet the collateral incisions, forming an obtuse angle. The flaps are brought together in the midline and the skin sutured with end-on mattress sutures of black silk. The vermilion border of the lip is reconstructed by dissecting the mucous membrane upward from the lower area of the flaps. This procedure, like any which interrupts the sphincter action of the orbicularis oris muscle, leaves a rather rigid upper lip, causing partial loss of function; the lower lip remains quite flexible.

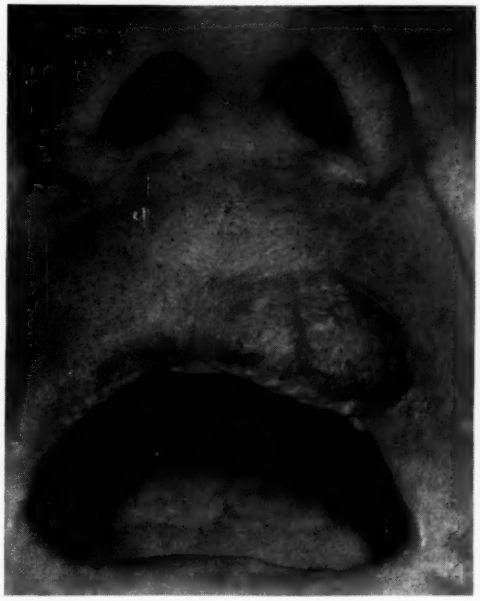

Fig. 9.—Squamous cell carcinoma of the upper lip that persisted during radium treatment for two years.

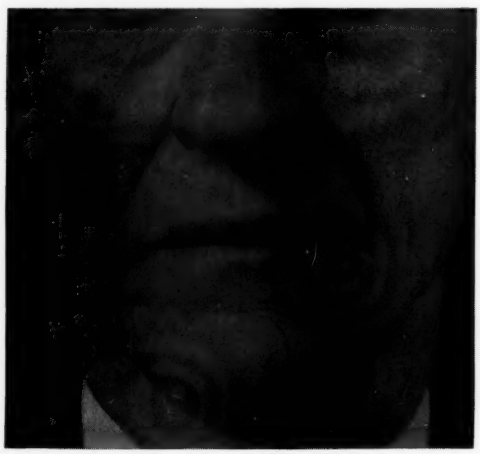

Fig. 8.—Good cosmetic result of excision of tumor in Figures 6 and 7. No recurrence after five years.

Cancers of the lateral third of the lips or commissures, frequently involving the mandible, when permitted to grow and extend along the mucous membrane and skin into the cheek,[27] are difficult to eradicate. It has been our policy to treat these tumors with a combination of high voltage roentgen therapy, giving a total dose of 6,000 roentgens, measured in air, to the tumor, protecting the tongue and jaw, if they are not involved, by lead or lead-rubber filters inserted in the mouth during the treatment. We do not expect to eradicate the tumor, but the irradiation will produce marked shrinkage, devitalize it to a degree and surround it with an area of firm scar tissue. After six or eight weeks the tumor is removed in its entirety, with electrosurgical dissection of an area of the man-

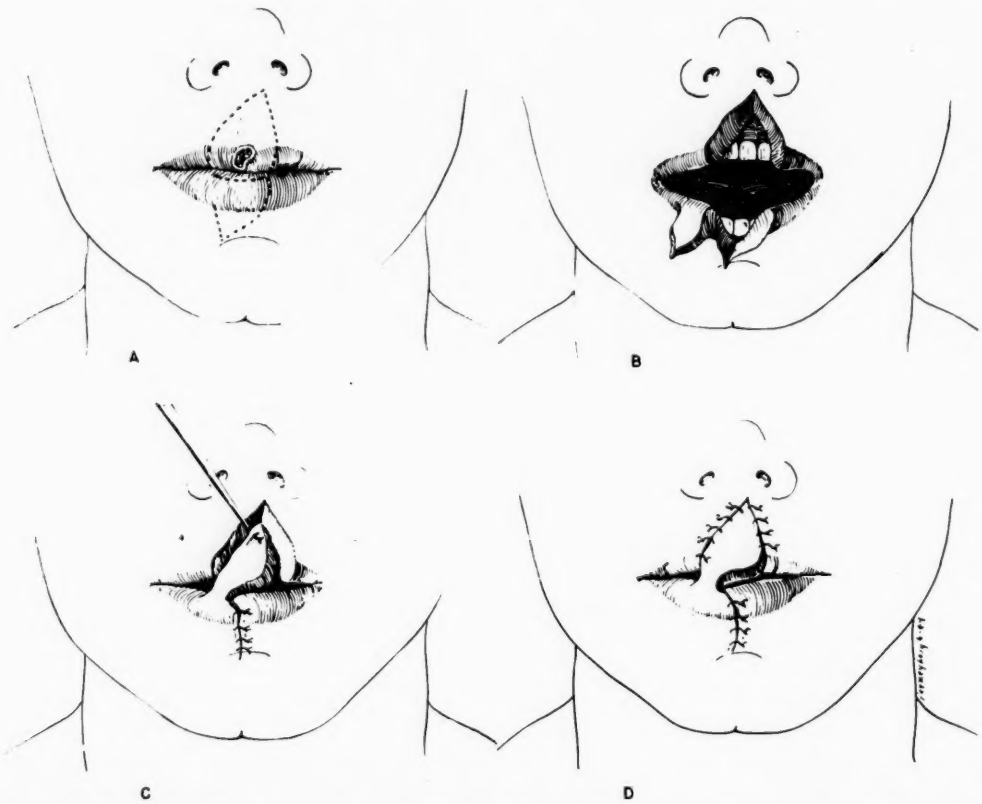

Fig. 10.—Tumor in Figure 9 removed by Abbey type of procedure, a wide margin being allowed around and beneath the lesion; flap brought up from lower lip and sutured in place; pedicle of flap severed ten days later and flap trimed.

dible if necessary. If only the outer table of the mandible is involved, it is removed and the inner table permitted to remain and regenerate. However, if the entire thickness of the mandible is involved,[28] which was true in 4 per cent of this series of cases, it also is removed. Frequently rather large defects are left in the lips and cheek; these may be closed by a tubed pedicle graft from the chest[29] or occasionally from the neck.

These extensive tumors may also involve the cervical lymph nodes in the suprahyoid area and/or the deep jugular chain; in these cases a dissection of the neck is carried out in conjunction with resection of the tumor and mandible (Figs. 14, 15 and 16). The pedicle graft from the chest can be prepared during the interval between irradiation therapy and electrosurgical removal of the tumor. Cosmetic results in such cases are only fair, since the oral fissure is markedly altered; however, curability is relatively good.

Treatment of Cervical Lymph Nodes and Cervical Metastases: Although practically all deaths from cancer of the lip are produced by cervical metastases, fortunately these cancers do not metastasize to the cervical lymph nodes as often and as rapidly as do those of the tongue and of the floor of the mouth; therefore the disease remains localized to

structures above the clavicle for a long period.[30] The development of radical treatment for metastatic cancer of the cervical lymph nodes is attributed to Bloodgood, Crile, Cheatle and Kocher. These surgeons well understood the cervical lymphatics, the manner in which the disease spreads and the therapy necessary to eradicate it.

Prophylactic treatment of cervical lymph nodes and cervical metastases has been discussed in the literature for many years. Formerly some advocated irradiation (radium or roentgen) in the prophylaxis and treatment of cervical metastases. It was contended that small doses of irradiation (1,500 to 2,000 roentgens) or a comparable amount of radium on each side of the neck would prophylactically sterilize the node-bearing areas. Further, endeavors were made to eradicate metastases, when present, with irradiation, either by radium packs, radium needles or roentgen therapy, and some cures were reported. However, these reports were not substantiated by biopsy of the cervical nodes under treatment. It is well established that a dose of 6,000 to 7,000 roentgens is required to eradicate even small primary cancers of the lip, and therefore it is impossible to imagine the neck being sterilized or metastatic cells in the lymph nodes being destroyed by prophylatic doses of 1,500 to 2,000 roentgens to the skin. Adequate treatment of the primary lesion has been repeatedly demonstrated as the best prophylaxis for cervical metastases. If this is accomplished, little danger arises that metastatic emboli will break off and involve the lymph nodes in the drainage area.

Blair and Brown, as well as others[31] express a definite opinion that in cases of lip cancer in which there is a reasonable chance of curing the primary lesion, a dissection of the lymphatic areas of the neck should be carried out regardless of whether clinical involvement of the cervical nodes is demonstrable. Lack of clinical enlargement of the lymph nodes does not necessarily mean that metastases are not present, and the patient should not be denied the improved prognosis that dissection of the neck may offer. Blair and Brown[24] stated that 20 per cent of patients with lip cancer have involvement of the nodes. Kennedy[23a] noted involvement of the cervical lymph nodes in the drainage area in 20 to 25 per cent of cases when the lip cancer was first observed. Morrow[32] pointed out that treatment, to be successful, depends upon getting ahead of the disease, which can best be done by routine suprahyoid dissection of the neck whether lymph nodes are palpable or not.

Our results show that treatment of lymph node metastasis from lip cancer is most successfully accomplished by surgical measures; the problem is what plan to follow when the lymph nodes are not clinically involved. We have formulated rather elastic rules for suprahyoid dissections of the neck. In addition to careful palpation of the neck, we take into consideration the histologic grade of the lip cancer, its size and duration, and the age and physical condition of the patient; we also attempt to discover whether the patient will cooperate in systematic follow-up. If he comes from a remote area or if he appears uninterested in a systematic followup, we find it necessary, for his protection, to do a prophylactic suprahyoid dissection of the neck.

Criteria for Dissection of the Neck: Patients with squamous cell carcinomas of Grades I and II, less than 2.5 to 3 cm. in diameter but without palpable nodes in the suprahyoid area, are not advised to have dissections of

Fig. 11.—Photograph taken six months after excision of tumor in Figures 9 and 10, showing good cosmetic result. No recurrence three years later. (From Ward and Hendrick, *Tumors of the Head and Neck.* Reproduced by courtesy of The Williams and Wilkins Company, Baltimore.)

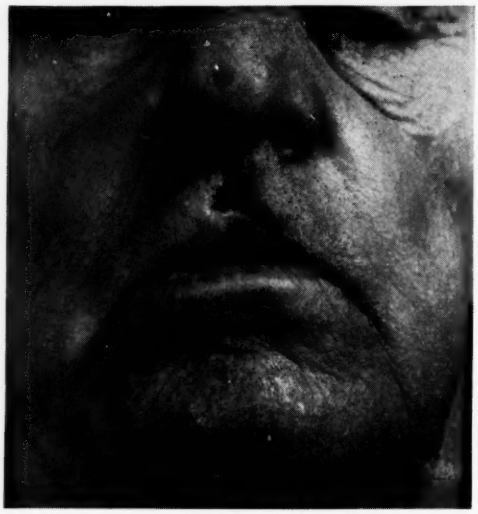

Fig. 12.—Carcinoma involving middle third of upper lip with wide zone of induration surrounding tumor.

the neck. We have found that this indolent type of cancer does not metastasize for a long time unless inflammatory reaction is stimulated by inadequate treatment with caustics, radium, roentgen therapy or desiccation.[33] If the primary lesion is badly inflamed, suprahyoid dissection of the neck should be carried out (Fig. 17).

We do not advise routine dissections of the neck for Grade I or Grade II lip cancers under 2 cm. in diameter when clinically involved nodes are not present in the suprahyoid drainage area, but we do advise the patients to be observed every two months the first year, every three months the subsequent year and every four months thereafter for five years. If nodes are clinically enlarged in either of these two groups, dissection of the suprahyoid neck is carried out. On the other hand, patients with lip cancers of Grade II or Grade III, over 2 cm. in diameter, of short duration and rapid growth, without clinical evidence of involvement of the lymph nodes, are advised to have routine suprahyoid dissections of the neck.

Suprahyoid neck dissection is advised for labial epitheliomas of long duration and of any histologic grade if they are over 3 cm. in diameter, even though no palpable nodes are present; we have frequently observed microscopic involvement of the lymph nodes in these large tumors.

Patients of advanced age with early metastatic involvement of the cervical lymph nodes should be treated by suprahyoid dissection of the neck with infiltration anesthesia if their general physical condition will permit.

Markedly undifferentiated primary lip cancers[34] probably are best treated with intensive roentgen therapy to the primary growth, followed by routine dissection of the suprahyoid neck after the primary lesion is completely healed.

If the cancer involves the lateral third of the lip and enlarged nodes are palpable on the side of the growth, suprahyoid neck dissection is limited to the involved side. However, if a malignant growth involves the middle third of the lip with nodes palpable on either side, a bilateral suprahyoid neck dissection is carried out. When involved nodes are found on one side of the neck on frozen section, the neck dissection is extended to take in the jugular chain of nodes, including the sternomastoid muscle, the internal jugular vein and the lymph-node-bearing fascia from the clavicle to the mandible on that side.

Contraindications to neck dissection exist when the suprahyoid and jugular chain of nodes is involved bilaterally; when the primary lip lesion is uncontrolled;[35] when distant metastases are present; when the patient is in poor general physical condition; when the primary lesion of the lip extends beyond the oral cavity, or when it is felt that the nodular capsule has been infiltrated and necrosis has occurred with involvement of the overlying skin.

Occasionally cases are observed in which the primary labial lesions remain healed but the patient returns with a group of nodes showing necrosis and involvement of the skin. If the enlarged nodes are limited to the suprahyoid area, it has been our policy to treat the patient as Quick suggested some years ago.[36] An incision is made over the necrotic mass and all necrotic tissue is curetted away. The capsule is then implanted with low intensity radium needles or the wound is treated with high voltage roentgen therapy (5,000 to 6,000

roentgens). After six to eight weeks the involved area is removed electrosurgically and a radical dissection of the neck is carried out, provided that the opposite side of the neck is free from obvious involvement. Frequently there is such extensive destruction of the skin that a pedicle graft is required to close the defect. This is well illustrated in Figures 18 and 19; in this case metastases to the nodes developed at the angle of the mandible after the primary lesion had been treated elsewhere with radium three years before. The necrotic tissue was excised and curetted away. The remaining capsule was then treated with low intensity radium needles followed by irradiation therapy. Eight weeks later the entire involved mass was removed electrosurgically and a radical dissection of the neck was done. A pedicle graft was then used to close the defect, and the patient was well, with no evidence of recurrence, seven years later.

It is our opinion that involvement of the suprahyoid lymph nodes represents metastatic emboli from the lablipial cancer and that the lymphatic channels in the tissue between the labial lesion and the suprahyoid nodes are not necessarily involved as in the case of carcinoma of the breast. If the lesion is treated with roentgen therapy and a suprahyoid dissection of the neck is indicated, it is our policy to wait until the primary lip lesion is completely healed before the dissection is done, which requires from four to six weeks. However, if the labial cancer is treated surgically, suprahyoid dissection of the neck is carried out at the same time, which spares the patient a second operation. Judd and Beahrs,[8b] Blair and Brown,[37] Brown and McDowell,[38] Figi,[39] Blair, Brown and Byars.[14e] Wangensteen and Randall,[19c] Dixon[25a] and Kennedy[40] have all concurred with this plan of management. On the other hand, Modlin,[34] Duffy,[41] Wile and Hand[19d] and Martin[42] have expressed the opinion that dissection of the neck should be delayed until it is certain that the primary lesion of the lip is cured. According to them, if infection is present in the lymph nodes as a result of infection of the parent tumor, time is allowed for it to subside after treatment of the labial lesion, which will permit a more accurate evaluation of the enlarged lymph nodes.

COMMENT

This group of 311 histologically proved epitheliomas of the lips treated at the Johns Hopkins Hospital, the University of Maryland Hospital and in our private practice is all-inclusive.

The patients are divided into two groups (Table 4): (*1*) the primary group, composed of patients who had received no treatment

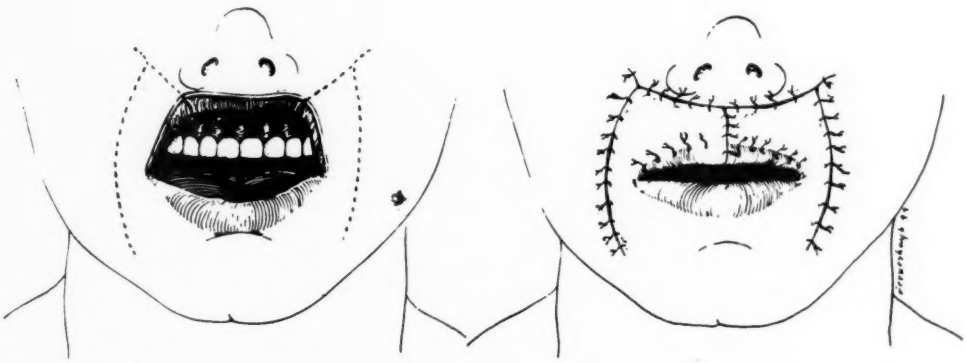

Fig. 13.—Denonvillier's operation for removal of large tumors of upper lip. (The upper lip is not very pliable after this type of procedure, but it gives a safe margin around the tumor and a fair cosmetic result. From Ward and Hendrick, *Tumors of the Head and Neck*. Reproduced by courtesy of The Williams and Wilkins Company, Baltimore.)

TABLE 1.—*Three Hundred and Eleven Cases of Carcinoma of the Lip*

Patient's age, years	Number
20 to 30	5
30 to 40	15
40 to 50	65
50 to 60	66
60 to 70	86
70 to 80	62
80 to 90	12

TABLE 2.—*Relation of Size of Lesion to Curability*

	Primary Group		Secondary Group	
Size of lesion in (cm.)	Number of cases	5-year cure (per cent)	Number of cases	5-year cure (per cent)
	214		97	
Under 1	84	94	1	100
1 to 2	76	84	27	69
2 to 3	32	65	42	50
Over 3	22	46	27	39

other than with innocuous salves before consulting us; (*2*) the secondary group, who had received previous treatment in the form of radium or roentgen therapy, electrosurgical measures, escharotics or a combination of these.

For a number of years we have seen patients who have been treated elsewhere with irradiation and who have indurated, ulcerated lesions on the lips. Not infrequently these patients state that they have received radium therapy or, occasionally, roentgen therapy over a period of several years. An endeavor is made in these cases to discover from each patient's physician the amount of therapy he has received. Usually the treatment consists of 200-300 milligram hours of radium or roentgen therapy of less than 1,000 roentgens. In these cases adequate biopsy is essential to determine whether the malignant growth is still present or whether the induration and ulceration are the results of prolonged inadequate therapy which has produced obliterating endarteritis and fibrosclerosis. If malignancy is not present, the ulcerated area is widely excised and the necessary plastic procedure instituted to correct the resultant defect. If, on the other hand, malignant areas remain, surgical excision should be carried out, with allowance for a wide margin since further irradiation would be useless.

A small percentage of the patients in this series had more than one cancer of the lip; several had two, and 1 patient had three at the time of admission. An occasional patient returned with what was an apparent local recurrence near the site of the original lesion, but upon careful examination it was determined that the patient had actually a new cancer. In patients with extensive keratosis or leukoplakia a second cancer of the lip not infrequently develops at some distance from the primary lesion; in such cases it is essential that all keratotic areas be removed.

In a previous report[11] we discussed in detail the relation between the curability of the lesion, its histologic grade, its size, its duration, the presence or absence of "positive" lymph nodes in the drainage area and the administration or nonadministration of previous treatment. It was shown in that report, as well in this, that the primary group had by

TABLE 3.—*Lymph Node Involvement*

	Number	Per cent
Primary group (214 cases)		
Palpable nodes	91	43
Neck Dissections	71	33
Nodes resected, positive	30	42
Local recurrence	15	7
Recurrence in nodes	35	16
Died of cancer, 0 to 13 years	24	
Secondary group (97 cases)		
Palpable nodes	59	59.9
Neck dissections	61	62.8
Nodes resected, "positive"	37	60
Local recurrence	8	9
Recurrence in nodes	26	30
Died of cancer, 0 to 13 years	26	

TABLE 4.—*End Results in All Patients Treated*

	5-year cures (per cent)
Primary group, 214	78
Operation, 116	92
Irradiation, 69	79
Combined irradiation and operation	51
Secondary group	
All methods, 97	67
Total number, 311	73

far the better prognosis and cosmetic results.

In the primary group of 214 patients there was a 78 per cent incidence of overall five-year cure. One hundred and sixteen of these patients underwent surgical excision of the primary lesion, with a five-year nonrecurrence rate of 92 per cent; 69 were treated with irradiation, with a five-year nonrecurrence rate of 79 per cent. Another group of 39 patients with more extensive carcinomas, who were treated with roentgen therapy, surgical intervention or both, showed a five-year nonrecurrence rate of 51 per cent.

In the secondary group of 97 patients who had been treated elsewhere for varying periods many of whom required multiple surgical procedures because of the extensiveness of their tumors, there was a five-year salvage rate of only 67 per cent.

The problem of handling the lymph nodes in the drainage area has been a controversial subject in the past. Table 3 shows our results, which substantiate our opinion that suprahyoid dissection of the neck is essential when indicated. In the primary group of 214 patients, 91, or 43 per cent, had enlarged lymph nodes on admission. Of these 71, or 33 per cent, underwent suprahyoid dissections of the neck. Of the group of 71 patients, 30, or 42 per cent, showed involvement of the nodes. That is, 14 per cent of the patients in the primary group had involved nodes on admission. In 35 patients, or 16 per cent, on whom prophylactic dissections of the neck had not been performed or in whose cases there was insufficient evidence to warrant the dissection on admission, recurrence in the nodes developed later. This results in a total of 30 per cent of the patients with labial cancer in whom the nodes were involved on admission or became involved subsequently.

Of the secondary group of 97 patients who had received treatment before admission and who had more extensive cancers of great duration, 58, or 59.9 per cent, had enlarged nodes. Of this group of 97 patients, 61 or 62.8 per cent underwent suprahyoid dissections of the neck. The resected nodes were "positive" in 37 or 60 per cent of the cases. Twenty-six patients, or 30 per cent, who did not have prophylactic dissections of the neck or sufficient evidence to warrant such dissections on admission, had a recurrence in the nodes. In other words, 61 patients of the 97 composing the secondary group showed involvement of the nodes, either on admission or as a later development.

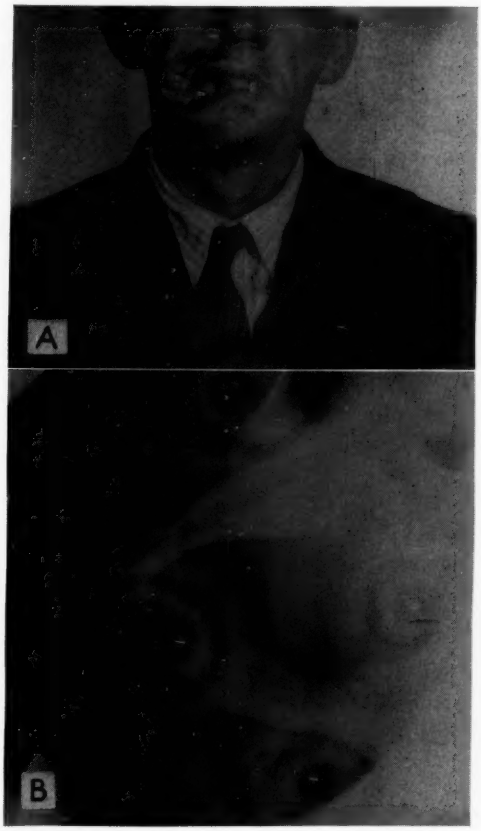

Fig. 14.—*A*, squamous cell carcinoma of lateral third of lower lip which persisted after repeated treatment with radium. Tumor has extended into cheek and involved mandible. *B*, roentgenogram of right mandible, showing involvement by tumor.

We contend that the condition of patients with cancer of the lip should have careful evaluation on admission, including biopsy of the primary lesion and meticulous examination of the lymph nodes in the drainage area, after which the lesion should be treated by the method best adapted to the particular type —either roentgen therapy in the amount of 6,000-7,000 roentgens, or surgical excision, a

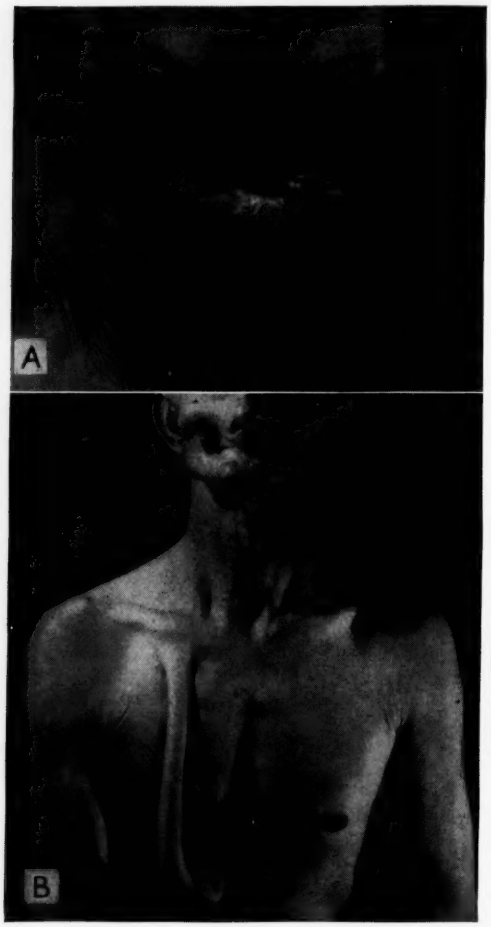

Fig. 15.—*A*, tumor treated with roentgen therapy (6,000 roentgens measured in air); six weeks later electrosurgical exicion and radical dissection of the neck were carried out. *B*, pedicle flap prepared from chest wall, lower end of which was lined with split-thickness graft to form lining of cheek.

wide margin being allowed around the tumor. Whichever therapy is employed, if there is evidence that the lymph nodes in the drainage area are involved a suprahyoid dissection of neck should be carried out either six weeks after irradiation therapy, if that form of treatment is elected, or at the same time the lip lesion is excised, because it is shown in this series that 14 per cent of the primary group had positive nodes on admission, as proved by histological examination of the nodes removed, and that 16 per cent of the cases later developed positive nodes.

It would appear that we are not radical or thorough enough in our treatment of carcinoma of the lip evidenced by the fact that the most carefully followed and reported series of cases shows only a 65-75 per cent five-year survival, even though these cancers remain localized above the clavicle in most instances and are easily accessible for examination and treatment.

SUMMARY AND CONCLUSIONS

1. The most effective treatment of cancer of the lip is to eradicate all premalignant lesions, such as fissures, keratoses, papillomas, epithelial warts and leukoplakic areas.

2. On admission a biopsy should be performed, with careful evaluation of the histologic grade of the tumor, its size, the length of time it has been present, the general physical condition of the patient and, most important, whether there is involvement of the lymph nodes in the drainage area.

3. Roentgen therapy is a valuable form of treatment for cancer of the lower lip under 2.5 cm. in diameter and 4 or 5 mm. in depth; if it is used on larger lesions involving the orbicularis oris muscle, there is a resultant defect which requires cosmetic repair. Roentgen therapy is of little value in the prophylaxis or treatment of the lymph-node—bearing area.

4. Epitheliomas involving less than one-third of the diameter of either lip can be removed by V-shaped surgical excision without

Fig. 16.—Graft placed in defect. No recurrence after six years. Rather good cosmetic result for extensive tumor.

altering the oral fissure. Larger lesions require some type of plastic reconstruction.

5. Patients who have received previous irradiation therapy require surgical excision of the tumor, as it is resistant to further irradiation.

6. Surgical intervention results in a 10 to 14 per cent better five-year nonrecurrence rate than does roentgen therapy. In a group of 116 patients treated surgically there was a five-year nonrecurrence rate of 92 per cent, and in a group of 69 patients treated with irradiation the rate was 79 per cent. The overall five-year nonrecurrence rate among patients who had received no previous treatment and those who had received previous treatment was 73 per cent.

RÉSUMÉ

1. Le traitement le plus efficace pour le cancer de la lèvre est d'enlever toutes les lesions prémalignes, telles que fissures, keratoses, papilomes, verues épitheliales et lésions leucophasiques.

2. Une biopsie faite soigneusement, le grade histologique de la tumeur, son étendue, son age, l'etat physique général du malade et, ce qui est le plus important, si les ganglions lymphatiques de la région sout attaqués.

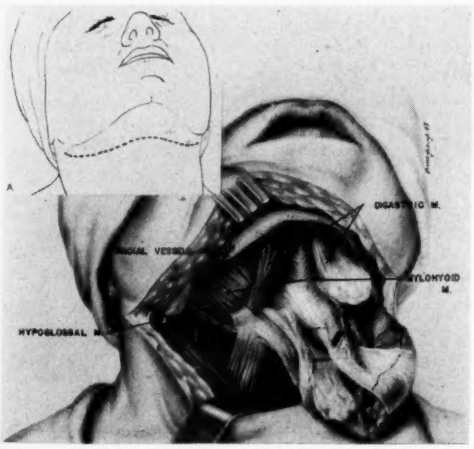

Fig. 17.—Suprahyoid block dissection of the neck for carcinoma of the lip and cheek; unilateral or bilateral as indicated. (From Ward and Hendrick, *Tumors of the Head and Neck*. Reproduced by courtesy of the Williams and Wilkins Company, Baltimore.)

Fig. 18.—*A*, patient treated elsewhere with radium for tumor on lateral third of lower lip, left side. Large necrotic lymph node developed below angle of mandible. No recurrence of lip lesion three years later. Lymph nodes curetted and treated with roentgen therapy (6,000 roentgens measured in air). *B*, result after electrosurgical removal of remaining involved lymph nodes. Radical dissection of the neck was performed, with removal of sternomastoid muscle, internal jugular vein and all lymph-bearing tissue.

3. Le traitement radiologique est une forme de valeur pour le traitement du cancer de la lèvre inférieure et d'un diamètre de 2.5 Cm et de 4 ou 5 mm de profondeur. Si la lésion est plus étendue, le muscle orbiculaire ovale, il résultera un défaut qui demandera une opéra-

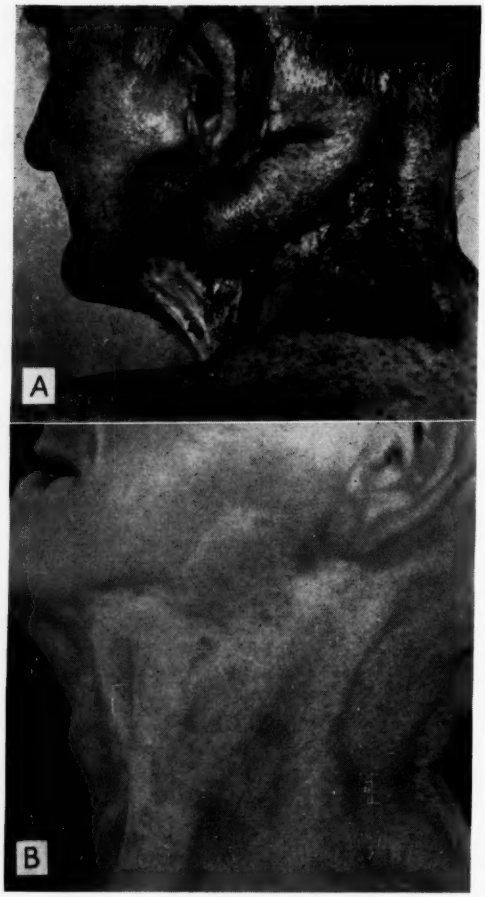

Fig. 19.—*A*, defect in lateral surface of neck after radical excision of metastatic lymph nodes. Pedicle graft brought from posterior lateral surface of neck. (To cover such a defect, including the carotid artery, the vagus nerve and other structures in the neck, requires a full-thickness graft.) *B*, cosmetic result seven years later, with no recurrence of labial tumor and no metastatic nodes in the neck. Patient refused plastic repair of lip defect.

tión plastique. Le traitement roentgenologique est de peu de valeur pour la prophylaxie ou pour le traitement des ganglions lymphatiques de la région.

4. L'épitheliome intéressant moins d'un tiers du diamètre de chaque lèvre peut être enlevé par une excision chirurgicale en forme de V- sans altération de la fissure orale. Les lésions les plus étendues exigent une réconstruction plastique.

5. Les malades qui ont été soumis à l'irradiation demandent l'excision chirurgicale de la tumeur, car elle est résistante à d'autres irradiations.

6. L'intervention chirurgicale donne des résultats de 10 a 14% meilleurs, si on considère la récidive de 5 ans que le traitement de Roentgen. Dans un groupe de 116 malades traités chirurgicalement, il n'y a pas en de recidives dans 92% des cas, et dans un groupe de 69 malades traités par l'irradiation, il y eut une recidive dans 79% des cas. Dans les malades qui ne reçurent aucun traitement préliminaires et dans ceux qui reçurent le traitement préliminaires, il y eut une recidive de 73% des cas.

RESUMEN Y CONCLUSIONES

1. El tratamiento más efectivo del cáncer del labio es la erradicación de todas las lesiones precancerosas, como fisuras, queratosis, papilomas, verrugas epiteliales y áreas leucoplásicas.

2. Al ingreso debe efectuarse una biopsia, con evaluación cuidadosa del grado histológico del tumor, tamaño, tiempo de evolución, estado físico general del paciente y, lo que es muy importante, si existe complicación linfoglandular del área correspondiente.

3. La röntgenterapia es forma terapéutica importante para el cáncer del labio inferior menor de 2.5 cm. de diámetro y 4 o 5 cm. de profundidad, empleándose en lesiones mayores que complican el músculo orbicular de los labios, aun cuando con pérdidas tisulares resultantes que requieren reparación plástica. La röntgenterapia es de poco valor en la profilaxis o tratamiento del área linfoglandular respectiva.

4. Los epiteliomas que interesan menos de un tercio del diámetro de cada labio pueden extirparse con excisión quirúrgica en V sin alteración de la fisura oral. Lesiones mayores requieren algún tipo de reconstrucción plástica.

5. Pacientes que hayan sido irradiados previamente requieren excisión quirúrgica del tumor, dada la resistencia a mayor irradiación.

6. La intervención quirúrgica da resultados del 10 al 14 por ciento mejores que la röntgenterapia respecto a la no recidiva en 5 años. En

116 pacientes tratados quirúrgicamente hubo 92 por ciento de no recidiva en 5 años. En 69 pacientes irradiados el índice fué de 79 por ciento. El índice total de no recidiva en 5 años para pacientes tratados y no tratados previamente fué de 73 por ciento.

RIASSUNTO

1. Nel trattamento del cancro del labbro, il piu efficace sia lo sradicamento di tutti lesioni pre maligni, come fessure, keratosi, papillome, porri epitelii ed aree leucoplachie.

2. Al entrata si fa la biopsia, apprezzando con attenzione il grado istologico del tumore, la grandezza, la durata del tempo d'esistenza, la condizione fisica generale del paziente, e piu importante complicazione di nodi linfatici dell' area di scorrimento.

3. Di valore e' la terapia Roentgen per cancro del labbro inferiore al di sotto di 2.5 cm. in diametro e 4 o 5 mm. profondo. Se s'impiega nelle lesioni larghe abbracciando il muscolo oris orbicularis risultera' in un diffetto che richiede riparo cosmetico. Terapia con raggi X e' di poco valore nel profilassi o cura del d'appoggio di nodi linfatici.

4. Epiteliomi meno che un terzo del diametro di ciascuno labbro si leva per eccizione chirurgica in forma di V senza alterazione della fessura orale. Lesioni piu larghe domandano ricostruzione plastico.

5. Pazienti che hanno ricevuto terapia precedente d'irradiazione richiedano eccisione chirurgica del tumore perche' porta resistenza ad altri irradiazioni.

6. Intervento chirurgico risultera' in 10 a 15 per cento migliore in casi del grado non-ricorrente per 5 anni che con terapia Roentgen. Nel gruppo di 116 casi trattati chirurgicalmente vi era' 92 per cento del grado non-ricorrente per cinque anni. Nel gruppo di 69 pazienti con irradiazione il grado era 79 per cento. Sopratutto il grado non-ricorrente per 5 anni fra i pazienti che non hanno ricevuto trattamento precedente e quelli trattati in anticipo era 73 per cento.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die wirksamste Behandlung des Lippenkrebses besteht in der Ausrottung aller praemalignen Veraenderungen wie Fissuren, Verhornungen, Papillomen, epithelialer Warzen und Leukoplakien.

2. Bei der Aufnahme des Kranken sollte eine Probeexzision ausgefuehrt werden. Dabei sollte der histologische Grad der Geschwulst sorgfaeltige Beruecksichtigung finden, ebenso ihre Groesse, die Dauer ihres Bestehens, der Allgemeinzustand des Kranken und vor allem auch die Frage, ob eine Beteiligung der regionaeren Lymphknoten vorliegt.

3. Die Roentgenbestrahlung stellt eine wertvolle Behandlungsform von Unterlippenkrebsen dar, die weniger als 2,5 cm in Durchmesser und 4 oder 5 mm in der Tiefe messen. Wird die Roentgenbestrahlung an groesseren Geschwuelsten, die den M. orbicularis oris einbeziehen, ausgefuehrt, so entsteht ein Defekt, der kosmetische Wiederherstellung erfordert. Die Roentgentherapie ist von geringem Wert in der Prophylaxe oder Behandlung der Lymphknotengebiete.

4. Epitheliome, die weniger als ein Drittel des Durchmessers einer Lippe einnehmen, koennen mit keilfoermiger chirurgischer Ausschneidung entfert werden, ohne die Mundoeffnung zu veraendern. Groessere Geschwuelste erfordern eine oder die andere Form plastischer Wiederherstellung.

5. Kranke, die schon frueher mit Bestrahlungen behandelt wurden, beduerfen der chirurgischen Entfernung der Geschwulst, da sie fuer weitere Bestrahlungen resistent geworden ist.

6. Die chirurgische Behandlung fuehrt zu 10 bis 14 Prozent besseren Fuenfjahresheilungen als Roentgentherapie. In einer Serie von hundertsechzehn chirurgisch behandelten Kranken betrug der Prozentsatz der Fuenfjahresheilungen 92, waehrend unter 69 mit Bestrahlung behandelten Kranken die Rate 79% war. Der Gesamtprozentsatz der Fuenfjahresheilungen von vorbehandelten und von nichtorbehandelten Kranken betrug 73.

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Ectopic Pregnancy

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ECTOPIC pregnancy or eccyesis signifies gestation occurring outside the uterus. Although the term "extrauterine" is more commonly employed to signify this condition, the expression "ectopic" (first used in 1873 by Robert Barnes) is the broader and more widely inclusive designation.

Historical Notes.—The subject of extrauterine pregnancy is one of the most interesting in the entire realm of obstetrics and gynecology. This type of gestation is not mentioned in the extant Greek and Roman medical literature. What is believed to be the first reference to abdominal pregnancy is found in that great rabbinical treasure house, *The Talmud*. The rabbis of *The Talmud* observed a child "which emerged from the abdominal side of the mother."

The Buddhists mentioned a peculiar form of pregnancy outside the womb. According to their legend, the boy Buddha was "born through the right side or the armpit of his mother."

The first definite mention of extrauterine pregnancy was made by Albucasis in the eleventh century. Later, Rialan (1626) referred to several cases. Since then an enormous literature has accumulated.

Many of the successful cesarean sections reported in the early literature were probably crude laparotomies for the removal of secondary abdominal pregnancies.

The first operation for extrauterine pregnancy in America was recorded by John Bard of New York. He described the case in a letter dated Dec. 25, 1759. The patient recovered.

In 1883, Robert Lawson Tait became the first to operate successfully for a ruptured tubal pregnancy and to establish the operative technic for this condition. A pioneer in many phases of operative gynecology, Tait had been asked during the summer of 1881 to see a patient whose condition had been diagnosed as tubal rupture with internal hemorrhage. It was suggested frankly that he "should open the abdomen and remove the ruptured tube."

In 1883 Tait did operate on a patient with a ruptured tubal pregnancy. The patient died, and he attributed his failure to faulty technic. In his "Lectures on Ectopic Pregnancy and Pelvic Hematocele," published in 1888, he presented a simple classification of ectopic pregnancy. Tait was the first to work out the pathology and treatment of pelvic hematocele. His lectures are classic, and his views on this subject are generally accepted by the medical profession.

Types of Ectopic Pregnancy.—By definition, an ectopic pregnancy is a pregnancy located outside the normal uterine cavity. Primary ectopic pregnancies, in the order of their frequency, are as follows: tubal pregnancy, ovarian pregnancy, abdominal pregnancy and cervical pregnancy. Tubal pregnancy includes pregnancy in the ampulla, the isthmus or the interstitial portion of the tube. When nidation occurs in the ampulla, pregnancy usually terminates in tubal abortion. In the isthmus, because the muscle fibers are not well developed and because the tube is too small to permit expansion of the fetal sac, gestation usually terminates by rupture, with formation of a pelvic hematocele. Sometimes this occurs as early as the second or third week. Eccyesis in the interstitial portion occurs far less frequently than in the previously mentioned portions of the tube. Interstitial gestation is of particular interest, not only because of its relatively low incidence but because it produces certain perils and problems not encoun-

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tered with the more common forms. According to Polak, interstitial gestation may terminate in one of the following ways:

1. Death of the ovum.
2. Expulsion of the ovum into the uterus, in which case the pregnancy may terminate as an abortion or proceed and develop as an intrauterine pregnancy.
3. Rupture into the peritoneal cavity, possibly with death of the mother from hemorrhage and shock.
4. Rupture into the broad ligament.

Ovarian pregnancy rarely occurs; however, it is not as rare as was formerly believed. Ovarian gestation may be the result of fertilization of an ovum which has not been extruded from the ovary after rupture of the graafian follicle, or of fertilization outside the ovary with subsequent ovarian nidation.

Abdominal gestation may be either primary or secondary. The primary type indicates that the initial implantation occurred in the abdominal cavity. Secondary abdominal pregnancy implies reimplantation following initial nidation at some other site.

Cervical eccyesis is the most rare type of ectopic pregnancy. In this instance the fertilized ovum traverses the uterine cavity and enters the cervical canal instead of being implanted in the upper portion of the uterus. Although there is no reason to believe that cervical mucosa possesses properties of resistance to the erosion and destruction of the trophoblasts, this mucosa is not well suited to nidation.

Etiologic Factors.—The actual causes of ectopic pregnancy are unknown, but the following causes have been advanced, with more or less possibility, in the order named: salpingitis, especially gonorrheal; pelvic adhesions; infantile tubes with imperfect development of the cilia; excessively long tubes; diverticula and accessory tubes; spasm of the tubes; muscle insufficiency and antiperistalsis; abnormal corpus luteum; endometriosis of the tubes, ovary or cul-de-sac; increased invasiveness of trophoblasts favoring ready nidation; transmigration from one ovary to the opposite tube; defective metabolism and nutrition; and primary defect of the germ plasm (which should never be forgotten).

Incidence.—Early statistics report the incidence of ectopic pregnancy as low as 1 in 20,000. DeLee reported a ratio of 1 ectopic pregnancy in 600 pregnancies. Schumann reported the ratio of 1 to 303. Wynne observed eccyesis in 1.3 per cent of pregnancies at the Johns Hopkins Hospital. Hanson reported a ratio of 1 in 70. Beacham and Beacham reported an incidence of 1 ectopic pregnancy in 208 deliveries.

In a previous report of a two-year (1945-1947) survey of 30 ectopic pregnancies in the charity service of the Jefferson-Hillman Hospital, Hagood and Otts reported the incidence at 0.9 per cent of 3,315 deliveries. In the Jefferson-Hillman Hospital all patients who are less than five months pregnant are admitted to the gynecologic service. Since the symptoms of ectopic pregnancy simulate those of other gynecologic conditions, it is well to compare these figures with the number of gynecologic admissions. Over a ten-year period (July 1940 to July 1950) in the Jefferson and Hillman Hospitals, there was a total of 12,579 gynecologic admissions. During the same period there were 256 cases of ectopic pregnancy proved by operation, giving an incidence of 2.03 per cent.

The ratio of ectopic pregnancy to normal intrauterine pregnancy is also interesting. During this same ten-year period there was a total of 31,006 deliveries, giving a ratio of 1 ectopic pregnancy for every 121 intrauterine pregnancies, or 0.82 per cent. Only since the transfer of the Medical College of Alabama in 1945 have the patients' records been kept in such order that consistent, dependable information is available for statistical purposes. Since that time there have been 137 ectopic pregnancies, an incidence of 0.75 per cent of the 18,386 obstetrical admissions and 1.82 per cent of the 7,552 gynecologic admissions. In this series there was 1 death, representing a mortality rate of 0.73 per cent. There was also 1 death in the first five years of this decade, resulting in an overall mortality rate of 0.78 per cent for the total of 256 ectopic pregnancies in the past decade. For statistical purposes, only the period from July 1, 1945 to July 1, 1950 will be used.

In the series at Jefferson-Hillman Hospital, it is interesting to note that 123 of 137 known

ectopic pregnancies were in the tubes. Of this number, 44 were in the left tube and 79 in the right. Five pregnancies in the left tube and 11 pregnancies in the right tube were not ruptured. One pregnancy in the group proved to be cervical. One 4 cm. fetus was an ovarian pregnancy, and there were 8 abdominal pregnancies, 4 ruptured and 4 not ruptured. Of the 6 abdominal pregnancies on which information was available, the average period of gestation was five months. The single death occurred in a case of abdominal pregnancy.

Reported Death: The single death included in this series was that of a 31-year-old Negress, a primigravida whose last menstrual period had occurred eight and one-half months prior to her admission to the hospital. Apparently she had had a normal pregnancy until that time. She was admitted to the hospital supposedly in labor and was to undergo cesarean section because of large uterine fibroids. After being in the hospital for several hours she was examined per vagina, and a mass was felt which later turned out to be the normal-sized uterus. On the operating table she was delivered of a living child of approximately eight to eight and one-half months' development; this was an abdominal pregnancy. After the delivery the placenta was found diffusely attached over the surface of the small intestine. Soon thereafter the patient began to bleed from the placental site, the placenta being left in place. She bled profusely after the operation, went into irreversible shock and died.

Age Incidence.—The 137 cases with available records, the age of patients with the number of ectopic pregnancies in that age group and the percentage in each group are as follows:

Age	*Number*	*Percentage*
16 - 20	6	4.38
21 - 25	30	21.9
26 - 30	43	31.39
31 - 35	43	31.39
36 - 40	13	9.49
41 - 45	2	1.46

The youngest patient in the series was 18 years old and the oldest 42. This table shows that at Jefferson-Hillman Hospital 63.78 per cent of all the patients, Negro and white, were between 26 and 35 years of age. There were 56 white patients and 81 Negro patients in the series, or 41 per cent white patients and 59 per cent Negro patients. Torpin, at the University of Georgia, with a series of 80 cases of ectopic pregnancy, reported a rough estimate of 60 per cent white and 40 per cent Negro patients. The incidence of ectopic pregnancies in the various age groups was essentially the same for the Negro as for the white patients admitted to this hospital. The majority of each race remained in the 26- to 35-year age group.

Status of Patients as to Pregnancies, Deliveries and Abortions.—Excluding the extrauterine gestation which causes these patients to come to the hospital, Beacham and his associates at Charity Hospital in New Orleans noted there were 62 primigravidas, 69 secundigravidas and 52 tertigravidas. They also recorded 17 septigravidas.

	Number of Previous Pregnancies		
	Beacham	*Jarcho*	*Douglas*
0	62	65	22
1	69	49	37
2	52	31	24
3		16	11
4		7	10
5		2	5
6		1	7
7	17	1	6
8		1	3
9			0
10			1
	200	173	126

Dindia and Turcotte reported a series of 90 cases of extrauterine pregnancy, in which 29, or 32 per cent, of the patients were nulligravidas and 21, or 22 per cent, were primigravidas.

Abortions in our series as compared with that of Jarcho is as follows:

Number of Abortions	*Jarcho's series*	*Douglas' series*
0	118	84
1	42	25
2	10	7
3	1	7
4	1	2
5	1	0
6		1
7		1
	173	127

Lack of information made it impossible to record the number of abortions previously experienced by these patients. The foregoing distribution is based on the 127 patients on whom information was available.

Pathologic Picture.—Tubal pregnancy is by far the most common form of eccyesis. Whether the ovum rests in the ampulla, the isthmus or the interstitial portion of the tube, the course is the same. Subsequent development may pursue a course of tubal abortion, tubal rupture, death of the embryo with resultant absorption or formation of a tubal mole analogous to the bloody or fleshy mole. The trophoblast produces cytolysis of the cells of the tubal mucosa, and the ovum then nestles into the muscular wall of the tube in a way similar to that of pregnancy within the uterus. A full decidua is rarely formed in the involved tube, but usually one finds islands of decidua in and near the implantation of the ovum and even in the other tube. The uterus usually increases in size to that of a two- or three-month intrauterine pregnancy, and the endometrium develops into a decidua vera through the uterine cavity. As the decidua in the tube is eroded by the villi of the decidual capillaries, they penetrate many blood vessels and also penetrate between muscular fibers. Conditions in the wall of the tube are so different from those in the thick decidua of the uterus that the dangers of tubal pregnancy are easily seen. Indeed, in the tube the ovum acts like a rapidly growing destructive neoplasm.

The ovum may be arrested between the folds of the redundant tubular mucous membrane, or it may attach itself to the top of a fold. In either case the growing ovum distends the tube to the point of rupture. Some hypertrophy of the tube occurs in all cases; in rare ones, the tube grows until term without rupture, these being the cases in which it has been supposed that muscle fibers could develop (at an advantageous site). Usually the hypertrophy of the muscle of the tube is insufficient to accommodate the growing egg, and the fibers at the placental site begin to be separated and destroyed by the erosive action of the villi. Soon a weak spot results. Any traumatism, such as may result from straining at the stool, coitus or bimanual examination may cause a slight hemorrhage and rupture, or the tube bursts from overdistention of the thin, necrotic wall, and the villi lie free in the peritoneal cavity. Depending upon the point of rupture, the tube may rupture into the broad ligament, the peritoneal cavity or the lumen of the tube, forming a hematosalpinx; or possibly it may form a hematocele in the cul-de-sac of Douglas. Rarely, lithopedion formation may occur and some months later a "foreign body" type of reaction take place.

When the ectopic pregnancy first becomes disturbed by uncontrolled hemorrhage, the decidua is usually shed in small pieces or, rarely, in a complete decidual cast. This is the source of the vaginal bleeding which is one of the primary symptoms of an ectopic pregnancy.

Abdominal Pregnancy: Although the embryo usually dies after tubal rupture and is thereafter slowly absorbed, it may live and develop for a time after tubal abortion. After it succumbs it eventually becomes mummified or infiltrated with lime salts. Further development of the fetus within the abdominal cavity subsequent to tubal or ovarian pregnancy is a secondary abdominal pregnancy, with the placenta maintaining its primary attachment instead of becoming detached and reimplanted in the peritoneal cavity. In these cases the placental relationships are difficult to determine at operation. The placenta is usually attached to the uterus or tube or spread out over the uterus and the adjacent coils of intestine.

Primary abdominal pregnancy is apparently not so rare as was formerly thought. Evidently the increased incidence of pelvic endometriosis has brought with it a corresponding increase in the incidence of primary pregnancy in the abdominal cavity. This pathologic process is always a serious obstetrical problem. Development may continue until the pregnancy is far advanced. The child is usually markedly deformed.

Ovarian Pregnancy: Nearly 100 cases of primary or true ovarian pregnancy have been recorded in the literature, but only about 60 are authentic. It would appear, however, that ovarian pregnancy is not at all rare. In a considerable proportion of cases it has escaped recognition. This may account for many recorded instances of life-endangering hemor-

rhage from the ovary. The belief established by Leopold that primary pregnancy results solely from fertilization of the ovum before its escape from the graafian follicle is no longer tenable. Primary ovarian pregnancy may occur after fertilization in the fallopian tube just as normal intrauterine gestation develops under the same circumstances.

Spiedelberg formulated certain criteria which are still accepted as prerequisite for a diagnosis of primary ovarian pregnancy:

1. The tube on the affected side must be intact and separate from the ovary.
2. The gestation sac must occupy the position of the ovary.
3. The sac must be connected with the uterus by the ovarian ligaments.
4. Ovarian tissue must be demonstrable on the wall of the sac.

In cases of unruptured ovarian pregnancy these criteria are superfluous. Microscopic study reveals chorionic villi and ovarian tissue. A definite decidua is lacking. Corpus luteum is usually absent, although it is present in some cases, either spread around the wall of the gestation sac or located in one part of the sac.

Clinical History.—It is not often that a physician will be blessed with a patient who walks into his office and states plainly, "I have an ectopic pregnancy on this side." On one occasion in the Jefferson-Hillman series that did happen. The reason for its happening, as may be suspected, was that this was the patient's second ectopic pregnancy.

However, other signs and symptoms certainly speak loudly in their own way to indicate the presence of ectopic pregnancy. The patient frequently is nauseated; usually she will have missed a peroid or will have had vaginal bleeding lasting only a day. This may only be called "spotting." A feeling of general malaise may be one of the symptoms; soreness of the breasts and sometimes cramplike pains may direct the patient's as well as the doctor's attention to the pelvis. If the patient consults the doctor before the tube has ruptured and he suspects an ectopic pregnancy, in doing a pelvic examination he is likely to find the involved tube soft—in fact, so soft that it is difficult to distinguish it from a portion of the pelvic bowel. It is frequently described as feeling like a sausage-shaped mass characterized by complete lack of tenderness and free mobility. Allen of the University of Illinois stated, "Always, we have taught our students that an irregular bleeding from the vagina indicated pregnancy or malignancy until proven otherwise. Placing the burden of this proof squarely on the shoulders of our house staff has made them almost too conscious of ectopic pregnancy if this be possible. The comparison in these young men as compared with those trained in the other services of a general hospital is quite striking." One point to remember is that with an ectopic pregnancy, even though some of the signs indicate intrauterine pregnancy, the symptoms will not be so severe. Before an ectopic pregnancy ruptures, a pregnancy test is indicated; for even though the pregnancy is outside the normal uterine cavity, the hormone necessary for the production of a positive result from a pregnancy test is still present. Also, the basal temperature, whether oral or rectal, will remain elevated in the case of an ectopic pregnancy just as in the case of an intrauterine pregnancy. A positive result from the pregnancy test and a negative result from a colpotomy aspiration for blood usually indicates either an intrauterine pregnancy or an unruptured ectopic pregnancy.

After the pregnancy ruptures there is an entirely different picture. Typically there is a sudden, lancinating pain in one side. Almost immediately the patient exhibits shock, with cold, clammy, sweaty skin and a very tender abdomen. The tender abdomen soon becomes extremely painful; the pain may radiate either down the leg or upward. Should blood irritate the diaphragm, it is characteristic for the pain to radiate into the shoulder. Cullen's sign of discoloration about the umbilicus is rarely seen and certainly is difficult to evaluate in the Negro. Pain in the shoulder, with or without jaundice, associated with metrorrhagia, indicates hemorrhage in the pelvis rather than stones in the gallbladder. Slight jaundice occurring in a patient suspected of eccyesis is almost pathognomonic of intra-abdominal hemorrhage. After rupture of an ectopic pregnancy the sedimentation rate is slow in contrast to that associated with an infectious process. The temperature is not usually elevated. The pulse is rapid and shallow. The

blood pressure drops as hemorrhage increases; the respirator rate increases, and the patient is in very critical condition.

Signs and Symptoms.—The statistics we are reporting compare favorably with statistics in the literature. Signs and symptoms were observed in this order: (*1*) pain; (*2*) bleeding; (*3*) fainting; (*4*) shock, and (*5*) a palpable mass.

Signs and Symptoms of Ectopic Pregnancy

	Pain	*Bleeding*	*Fainting*	*Shock*	*Palpable Mass*
1st	93	35	9	7	4
2d	30	56	9	0	7
3d	3	3	2	7	2

This table gives an indication of the frequency of the cardinal signs of ectopic pregnancy, particularly if ruptured. The signs and symptoms were classified in the order in which they appeared rather than on the basis of severity. Pain still was the first and foremost complaint. Ninety-three patients listed it as first; 30 patients listed it as the second most severe symptom, and 3 patients listed it as third. Thirty-five patients listed bleeding first; 56 listed it second, and 3 listed it third. Shock was the most severe symptom in 7 cases.

Diagnosis.—It has been said that tubal pregnancy is more often overlooked when present and more often diagnosed when not present than is any other serious pelvic lesion. In doubtful cases, the majority remain doubtful until after tubal abortion or rupture. Examination, with the patient under anesthesia, should precede the abdominal incision. The diagnosis of ectopic pregnancy cannot be made or ruled out by any single means; it is made only after evaluation of all the available information in the case. One of the most important features of all is the history. The symptoms as given in the patient's own words, the physical signs, and a minimum of laboratory procedures (which sometimes add confusion to an already confused situation) all go into the making of a most important decision. The tube is usually soft and may be very tender. As a diagnostic test, one of the frog tests is recommended. We use in our private offices the X-L South African frogs. Physical examination sometimes reveals a pelvic mass. Usually the sedimentation rate is slow and the white blood cell count comparatively low. Of the series of patients at the Jefferson-Hillman Hospital, only 10 had had a pregnancy test performed before operation. Seven of the determinations were positive, indicating pregnancy. Of the 3 remaining cases, there was an abdominal pregnancy in 1; the fetus was dead. A second determination was made on a patient in whom the tube had ruptured some time before. In only 1 of the 10 determinations was the result apparently in error.

A second very important procedure, in our opinion, is aspiration of the cul-de-sac. Many of the patients in this series were private patients and were operated upon by general surgeons. A total of 76 patients did not have a cul-de-sac aspiration. Of the 52 patients who had a cul-de-sac aspiration, 47 results were positive. By this we mean that old, dark blood was aspirated from the cul-de-sac. This is not conclusive of a ruptured ectopic pregnancy. One further characteristic of the blood is very important, and that is the fact that it does not clot. Fresh blood from the pelvic veins will clot. One who should aspirate a pelvic vein and fail to observe the clotting properties might be led astray. Of the 5 cases in which the cul-de-sac aspiration gave negative results, unruptured tubal pregnancies existed in 2.

Another procedure in the diagnosis of ectopic pregnancy is peritoneoscopic investigation. The use of this procedure has been limited, but those who have used it seem to think highly of it when the results are correctly interpreted.

Since the beginning of the resident training program of the Medical College of Alabama, the accuracy of preoperative diagnosis has

been most encouraging. Preoperative diagnosis was correct in 113 of the 137 cases of ectopic pregnancy. In 24 cases the condition was missed, giving a percentile accuracy of 82 per cent. Of the 24 ectopic pregnancies missed, not one had been investigated by a cul-de-sac aspiration. Evidently ectopic pregnancy was not considered, and hence the colpotomy was not deemed necessary. Exact percentages are not available, but the diagnosis was much more frequently missed by the visiting general staff than by the resident staff of the hospital. Delay in diagnosis and treatment may end fatally for patients with ectopic pregnancy, since it gives time for complications to set in. Frequently a patient's condition will fluctuate from the time she first has a hemorrhage to the time that she has her terminal hemorrhage; hence, delay is mentioned only to be condemned in the treatment of ectopic pregnancy.

Differential Diagnosis.—Differential diagnosis in ectopic pregnancy includes consideration of well over fifty pathologic conditions of the pelvis. As a rule, however, the following conditions are most likely to confuse the diagnosis: abortion; angular pregnancy; appendicitis; corpus luteum rupture; ovarian, endometrial, or corpus luteum cysts; fibromyoma; ruptured graafian follicle; hematosalpinx; hydrosalpinx; infected hematoma or hematocele; acute pancreatitis; complications of intrauterine gestation, and pelvic inflammatory disease. It must also be remembered that in some cases intrauterine as well as extrauterine pregnancy has been observed in some cases.

Treatment.—"Watchful waiting" in the presence of ectopic pregnancy at any stage is extremely dangerous, as the sac may rupture at any moment and the patient die of hemorrhage. Treatment for ectopic pregnancy is surgical. Operative intervention to the extent of stopping hemorrhage is indicated, and in the majority of cases it consists only of salpingectomy or unilateral salpingo-öophorectomy. The sheet anchor of treatment is supportive therapy; namely, *blood transfusion or plasma transfusion* prior to the operation and possibly autotransfusions during the operation or thereafter. Until bleeding is stopped, blood should be given continuously. Operation should be performed as soon as transfusion is available and under way. It is the opinion of many that a short period of stabilization may aid the patient more than will immediate surgical intervention; but if the patient cannot be stabilized in one or two hours, operation should be performed at once.

Operative Technic.—An abdominal incision is usually employed, though Heaney and Babcock often use the vaginal route, which in their opinion shortens hospitalization and decreases the likelihood of morbidity. For all practical purposes, however, the abdominal approach is more convenient and less hazardous. Extreme haste in the procedure is not necessary, though it certainly is not advisable to perform other operations, such as appendectomy, at this time.

Operative Picture.—The unruptured ectopic tubal pregnancy presents a problem, especially with a previously infected pelvis. In such an instance it is often difficult to determine the site of pregnancy.

In the presence of ruptured ectopic pregnancy, however, the characteristic feature is the presence of varying amounts of blood in the peritoneal cavity, much of which will be clotted, though some may not be. The rupture in the tube usually is easily located, and the bleeding stopped by ligation or suture ligature around the tube. The tube can then be removed.

Prognosis.—The prognosis of ectopic pregnancy depends greatly upon the availability of blood or plasma and the rapidity with which the patient is handled. From the hospital service at the Jefferson-Hillman Hospital, the average postoperative stay in the hospital was eight and seven-tenths days. Statistics were not available on the total number of transfusions given, but blood was available through the blood bank of the hospital and plasma through the Red Cross. One or the other or both were used as needed for every patient, almost without exception. Certainly this must be given due credit in producing the low death rate.

Statistics.—The experiences of the staff at the Jefferson-Hillman Hospital may be summarized, in the form of statistical tabulation, as follows:

1. Total ectopic pregnancies 1940-1950..... 256
2. Total obstetrical admissions 1940-1950.....30,006
3. Ratio of ectopic pregnancies to obstetrical admissions 1940-1950..... 0.82—1 in 121 pregnancies
4. Total gynecologic admissions 1940-1950.....12,579
5. Ratio of ectopic pregnancies to gynecologic admissions 1940-1950..... 2.03—1 in 49.1 gynecologic admissions
6. Total ectopic pregnancies in series 1945-1950..... 137
7. Total obstetrical admissions 1945-1950.....18,386
8. Ratio of ectopic pregnancies to obstetrical admissions 1945-1950..... 0.74—1 in 134 pregnancies
9. Total gynecologic admissions 1945-1950. 7,552
10. Ratio of ectopic pregnancies to gynecologic admissions 1945-50..... 1.81—1 in 55 gynecologic admissions
11. Total white patients—56 (137) 49 (87.5%) in 21-35 year age group
12. Total Negro patients—81 67 (82.7%) in 21-35 year age group

#	0	1	2	3	4	5	6	7	8	9	10
13. Gravida	22	37	24	11	10	5	7	6	3	0	1
14. Para	35	39	19	14	7	5	5	0	1	-	-
15. Abortions	84	25	7	7	2	0	1	1	-	-	-

16. *Signs and Symptoms*

Symptoms:	*Pain*	*Bleeding*	*Fainting*	*Shock*	*Mass*
Order					
1st	93	35	9	7	4
2nd	30	56	9	0	7
3rd	3	3	2	7	2

17. Cul-de-sac aspirations—52 (47 positive results, 5 negative, of which 2 were unruptured)
18. 123 tubal pregnancies: 79 right ovary; 68 ruptured, 11 unruptured; 44 left ovary: 39 ruptured, 5 unruptured
19. 1 ovarian pregnancy and 1 cervical pregnancy
20. Eight abdominal pregnancies: 4 ruptured, 4 unruptured
21. Average hospital stay, 8.74 days
22. 137 cases: 113 (82%) correct preoperative diagnoses
23. 2 deaths in the entire series of 255 cases, giving a mortality rate of 0.78%
24. Whole blood and/or blood plasma administered to almost every patient when shock or vasomotor collapse was present or seemed imminent

SUMMARY AND CONCLUSIONS

1. Ectopic pregnancy, particularly of the tube, will always remain one of the most serious entities in surgical practice.

2. History of a "missed period" and the occurrence of low abdominal pain, vaginal menstrual-type spotting, fainting, shock, and a palpable mass still remain the primary diagnostic points for eccyesis.

3. Ectopic pregnancy must be considered in every case of acute disease of the abdomen.

4. Routine needle aspiration of the cul-de-sac of Douglas is strongly advised in the presence of suspected eccyesis either with or without rupture.

5. Whole blood and/or plasma should be used to maintain the patient until operation can be performed.

6. Surgery is *the* method of treatment of ectopic pregnancy, and "procrastination is the thief of Life" in dealing with eccyesis.

RÉSUMÉ

1. La grossesse ectopique, principalement tubaire est toujours une entité chirurgicale très sérieuse.

2. L'histoire d'une période menstruelle manquante et la présence de douleurs abdominales, de pertes, de taches menstruelles vaginales, de défaillance, de choc et de masse

palpable pelvienne sont d'une importance primaire pour le diagnostic.

3. La grossesse ectopique doit être considérée dans tous les cas de maladie aiguë de la partie inférieure de l'abdomen.

4. L'aspiration avec une aiguille du cul-de-sac de Douglas est fortement recommandée dans les cas douteux avec ou sans rupture.

5. La transfusion sanguine ou de plasma sera employée pour fortifier le malade jusqu'au temps opératoire.

6. La chirurgie est la méthode de traitement de grossesse ectopique et tout retard peut être mortel.

RESUMEN Y CONCLUSIONES

1. El embarazo ectópico, particularmente de la trompa, permanecerá siempre como una de las entidades más graves en la práctica quirúrgica.

2. La historia de "falta de período" y la ocurrencia de dolor abdominal bajo, pérdida vaginal de tipo menstrual, desmayo, choque y una masa palpable aun permanecen los primeros puntos de diagnóstico para ecciesis.

3. El embarazo ectópico debe considerarse en todo caso de abdomen agudo.

4. La rutinaria aspiración con aguja del fondo de saco de Douglas es muy de aconsejarse en caso de sospecharse ecciesis con o sin ruptura.

5. Deberán usarse sangre o plasma para sostener al paciente hasta que la operación pueda efectuarse.

6. La cirugía es el método terapéutico del embarazo ectópico y en tratándose de ecciesis "la tardanza es el ladrón de la vida."

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die ektopische Schwangerschaft, besonders die Tubargraviditaet wird immer ein aeusserst ernsthafter Gegenstand der chirurgischen Praxis sein.

2. Die Anamnese einer "ausgebliebenen Periode," das Auftreten von Schmerzen im Unterbauch, menstruationsaehnliches, tropfenweises Bluten aus der Scheide, Ohnmachtsanfaelle, Schock und eine palpierbare Geschwulst bleiben die primaeren diagnostischen Anzeichen fuer extrauterine Schwangerschaft.

3. Ektopische Schwangerschaft muss in jedem Fall als eine akute Baucherkrankung aufgefasst werden.

4. Beim Verdacht auf extrauterine Schwangerschaft mit oder ohne Durchbruch wird die routinemaessige Ansaugung des Inhalts des hinteren Douglas mit einer Nadel dringend empfohlen.

5. Transfusionen von Blut oder Plasma oder beidem sollten angewandt werden, um die Patientin am Leben zu halten, bis die Operation ausgefuehrt werden kann.

6. Bei extrauteriner Schwangerschaft ist die chirurgische Behandlung *die* Behandlung, und "Verzoegerung ist ein Lebensraeuber."

RIASSUNTO

1. Gravidanza ectopia, particolarmente del tromba di Fallope, rimanerá una dei piu grave entita nella practica di chirurgia.

2. La storia d'un periodo omesso e l'accorrenza di dolore addominale basso, macchia vaginale tipo mestruale, svenimento, shock, e una massa palpabile, ancora rimangano punti cardinale nella diagnosi.

3. Dovrebbe essere considerato in tutti casi di malattia acute addominale, la diagnosi di gravidanza ectopica.

4. Aspirazione pratica del cul-de-sacco di Douglas e vigorosamente consigliato nella presenza d'un "eccysis" sospetto sia, con oppure senza rottura.

5. Sangue intatto e/od plasma s'impiega per sóstenire il paziente in anticipo del operazione.

6. Chirurgia é il metodo de trattamento. Procastinazione é ladrone della vita.

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Announcement

INTERNATIONAL BOARD OF OCCUPATIONAL SURGERY

The Executive Council of the United States Chapter and the Board of Trustees of the International College of Surgeons have unanimously approved the formation of an International Board of Occupational Surgery, the aims of which are (*a*) elevation of standards for the practice of occupational surgery, (*b*) conservation of the health of the worker after occupational injury, (*c*) official recognition of this specialty, (*d*) stimulation of interest in this field by students and members of the profession, and (*e*) cooperation in the establishment of facilities for graduate education in occupational surgery by means of residencies in hospitals affiliated with medical schools, or their equivalents.

Frederick W. Slobe, M.D., F.A.C.S., F.I.C.S., Chairman

E. C. Holmblad, M.D., F.A.C.S., Secretary

For further details, address Dr. Arnold S. Jackson, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Inguinal Hernia

A New Surgical Treatment

ANDRÉ HEFFEZ, M.D.
CAIRO, EGYPT

NOTHING is more dispiriting to a surgeon than to operate on a hernia and have it recur. Faced with the patient and his unspoken blame, the surgeon feels as guilty as though he were totally responsible for the inadequacy of the surgical procedure.

This fact is the principal basis of the present contribution. Later I intend to publish, under the title "Contribution to the Study of the Inguinal Canal," a piece of work I have perfected at the Faculty of Medicine in Cairo, where I am a co-worker of Dr. B. Boulgakow, Curator of the Museum of Anatomy.

The eclectic procedure suggested here is most radical. It is not claimed that all recurrences will be prevented. It does represent, however, an entirely new approach to the problem. Summing up the available data on surgical technics for inguinal hernia, one finds that each of the procedures hitherto used has derived some part of its technic from one or more others. I shall mention only those best known: the method of Bassini, that of Championniere, that of Forgue, that of Cannaday (who implants a cutaneous graft from which the fat has been removed) and that of Narath and Lotheissen, who stitch Cooper's ligament to the conjoined tendon.

Other known methods are variations of these technics. To find a new technic, it was necessary to make a clean sweep of all old ones.

A preliminary word about the international statistics upon which my researches are based is here in order. Leigh,[1] in a series of 2,250 inguinal hernias, encountered 286 recurrences. According to his data, direct inguinal hernia recurs in 10 to 20 per cent of cases, sometimes even from 25 to 50 per cent. External oblique inguinal hernia recurs only within the limits of 5 to 10 per cent. Sertoli,[2] reporting the figures of Ceci of Pisa in 1909, noted 2 per cent of recurrences in 1,509 cases of hernia of the groin. Fantino[3] pointed out 74 recurrences among 4,200 inguinal hernias. He noted that the recurrence rate increased with the age of the patient: 4 per cent for patients 20 to 60 years old, and 9 per cent, or more than double, for patients aged 60 and over. He made particular mention of the impressive recurrence rate of 14 per cent for direct inguinal hernia.

The statistics at this hospital (Jewish Hospital of Cairo, Department of my chief, Prof. Picard) are as follows:

1. Forty-three cases of hernia in children, with 1 recurrence, which is exceptional.
2. Five hundred and ninety-eight cases of hernia in men, with 57 recurrences.
3. Thirty cases of hernia in women, with 3 recurrences.

These figures depend on various factors: the ability of the surgeon, the cellular type of the tissue involved, the sex of the patient and, above all, the surgical technic employed. Since the introduction of this new technic most recurrences in our hospital have taken place after operation by other surgeons.

An anatomic outline is necessary as a preliminary to setting forth the technical details. If one examines a human fetus of 24 cm., one observes that the cutaneous orifice of the inguinal canal is median and vertical. In the course of development the anterior and upper iliac spine deviates from the pubis, and the false pelvis lengthens laterally after development of the iliac wing. There results a stretching of the soft parts attached to the skeleton and, in these circumstances, of the large abdominal muscles. The inguinal canal becomes oblique instead of vertical and lateral instead of median. As a result of the stretching its tissues lose their firmness and become thin and dissociated, and, especially in this region, where the inguinal canal is weak, cause predisposition to hernia.

The retroparietal peritoneum, facing the deep orifice of the inguinal canal and following the course of the cord, insinuates itself along the canal in a manner conducive to any

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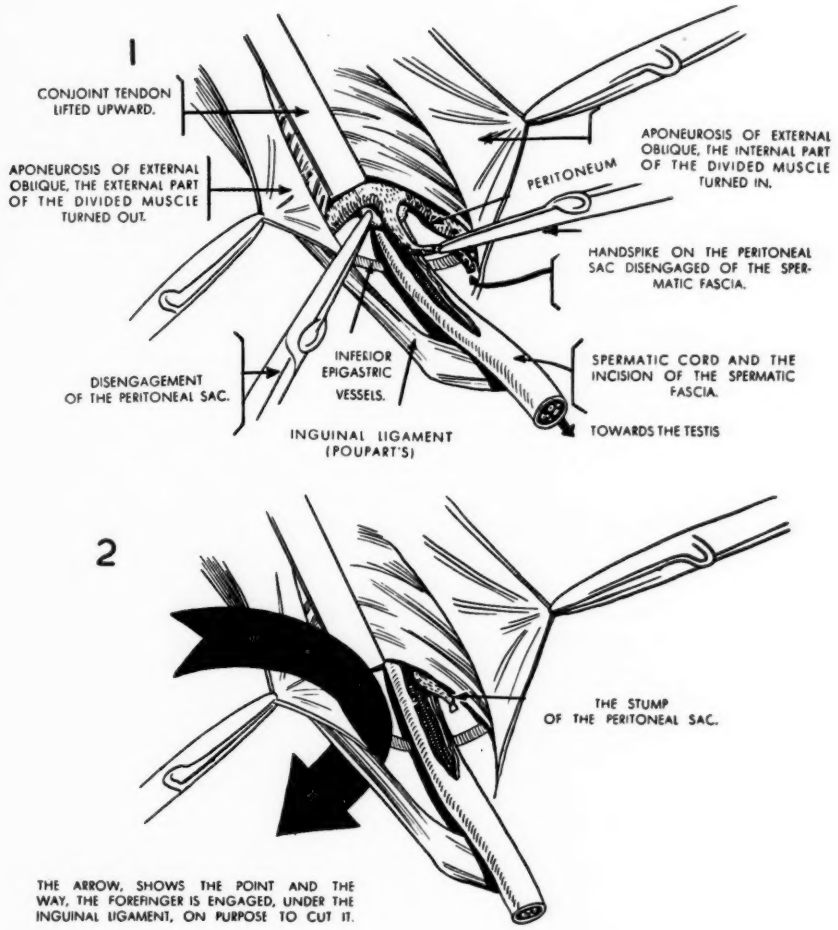

1
CONJOINT TENDON LIFTED UPWARD.
APONEUROSIS OF EXTERNAL OBLIQUE, THE EXTERNAL PART OF THE DIVIDED MUSCLE TURNED OUT.
PERITONEUM
APONEUROSIS OF EXTERNAL OBLIQUE, THE INTERNAL PART OF THE DIVIDED MUSCLE TURNED IN.
HANDSPIKE ON THE PERITONEAL SAC DISENGAGED OF THE SPERMATIC FASCIA.
DISENGAGEMENT OF THE PERITONEAL SAC.
INFERIOR EPIGASTRIC VESSELS.
SPERMATIC CORD AND THE INCISION OF THE SPERMATIC FASCIA.
INGUINAL LIGAMENT (POUPART'S)
TOWARDS THE TESTIS
2
THE STUMP OF THE PERITONEAL SAC.
THE ARROW, SHOWS THE POINT AND THE WAY, THE FOREFINGER IS ENGAGED, UNDER THE INGUINAL LIGAMENT, ON PURPOSE TO CUT IT.

degree of external oblique hernia. The direct hernia, which inserts itself into the small cavity included between the epigastric artery on the outside and the umbilical artery on the inside, also appears at the cutaneous orifice of the inguinal canal.

It is therefore logical to assume that a technic which leads to definitive removal of the inguinal canal, though sparing the elements that cross it, will reduce or even ward off the chances of recurrence. This precisely is the aim of the technic to be presented.

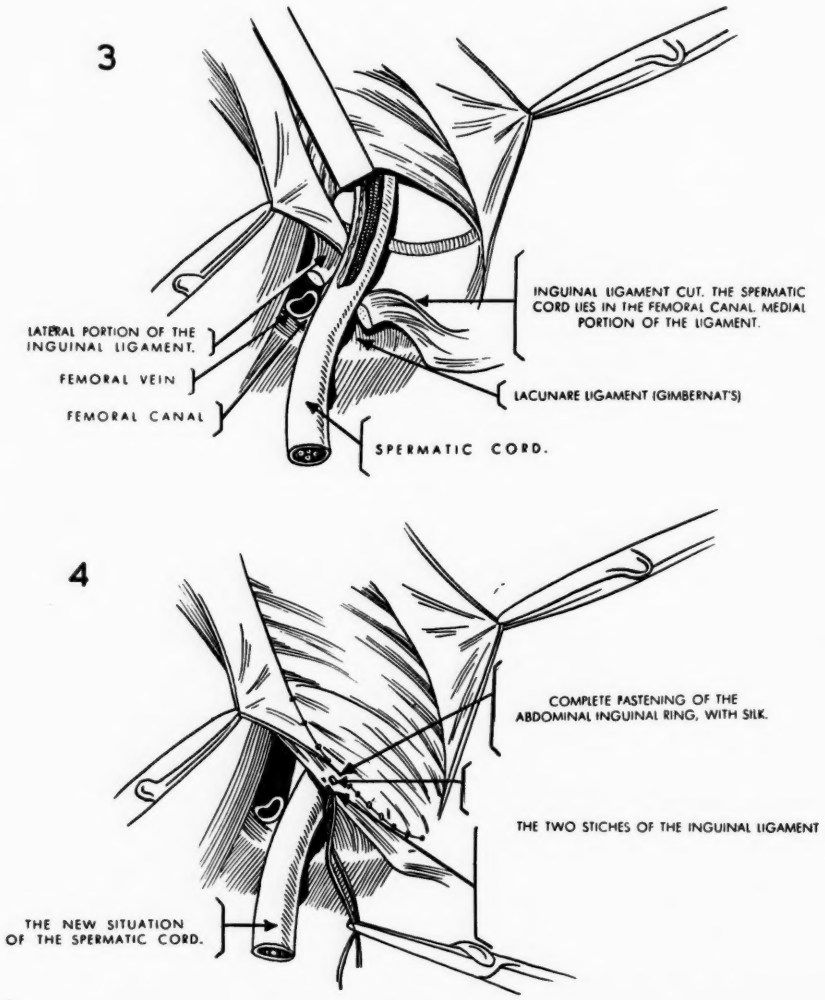
Note—The cuts to illustrate this article were made abroad and include legends.

Details of Surgical Procedure.—This operation is performed in three separate steps.

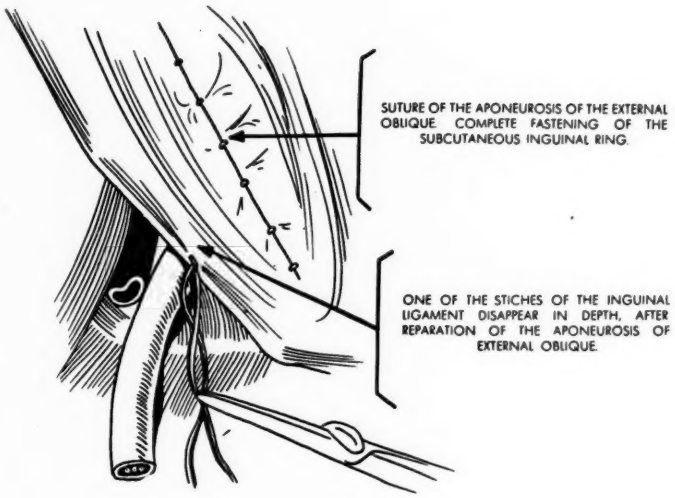
Step 1: The classic cutaneous incision is made. The aponeurosis of the greater oblique muscle is flattened by cleavage along the inguinal canal. The spermatic fascia is split, the separation from the hernial sac being followed upward as far as possible until the actual neck of the sac is reached. (Many recurrences are due to incomplete removal of the sac.) The sac is then opened to verify its contents and is closed again, after torsion, with one or two ligatures; the underlying shreds are then disposed of. I have abandoned the method of

Barker, finding it dangerous; if one ties the peritoneum to the anterior muscular coating of the abdomen, the hernia may recur because of muscular dehiscence. In removing the sac, great care must be taken not to injure the epigastric pediele, which tends toward the posterior face of the rectus muscle, inside the cord on a posterior plan. At the same time the cord is freed as far upward as possible from its links to the peritoneum, this being accomplished by means of pincers carrying a tuft of gauze. The maneuver is somewhat hemorrhagic, but the bleeding is of the parenchymatous type and not alarming. Finally, those fibers of the cremaster muscle which may still impede the lowering of the cord should be detached (Step 2, Fig. 1).

Step 2: By means of gauze mounted on pincers, the internal extremity of Poupart's ligament is liberated on its crural slope. The femoral packet is accurately located with the finger. The bent forefinger is inserted from the top downward, from the abdomen toward the thigh, under Poupart's ligament. The latter


3
INGUINAL LIGAMENT CUT. THE SPERMATIC CORD LIES IN THE FEMORAL CANAL MEDIAL PORTION OF THE LIGAMENT.
LATERAL PORTION OF THE INGUINAL LIGAMENT.
FEMORAL VEIN
FEMORAL CANAL
LACUNARE LIGAMENT (GIMBERNAT'S)
SPERMATIC CORD.
4
COMPLETE PASTENING OF THE ABDOMINAL INGUINAL RING, WITH SILK.
THE TWO STICHES OF THE INGUINAL LIGAMENT
THE NEW SITUATION OF THE SPERMATIC CORD.

5


SUTURE OF THE APONEUROSIS OF THE EXTERNAL OBLIQUE. COMPLETE FASTENING OF THE SUBCUTANEOUS INGUINAL RING.
ONE OF THE STICHES OF THE INGUINAL LIGAMENT DISAPPEAR IN DEPTH, AFTER REPARATION OF THE APONEUROSIS OF EXTERNAL OBLIQUE.

is split along the ligament of Gimbernat at the level of the crural infundibulum (Figs. 2 and 3). The cord is then laid down on the bed of the pectineus muscle and the lesser adductor muscle, covered by their aponeuroses. Continuity of the ligament is reestablished by two stitches of strong silk (Fig. 4). The internal fragment, as it is drawn in, may be difficult to bring into apposition with the external fragment; a firmer repair can then be assured by borrowing tissue from Gimbernat's and Cooper's ligaments.

Step 3: The conjoined tendon is next joined to the inguinal ligament; the two structures are stitched together with a few interrupted silk sutures. It should be borne in mind that this maneuver weakens the inguinal region; too much pulling on the conjoined tendon may open the way to direct hernia. It is therefore necessary to keep very close to the inferior edge of the conjoined tendon while suturing. With the cord in its new situation, this maneuver obstructs completely the deep orifice of the inguinal canal (Fig. 4). The aponeurosis of the greater oblique muscle is then sutured and the external orifice of the inguinal canal completely closed (Fig. 5), as there is no further necessity for its existence.

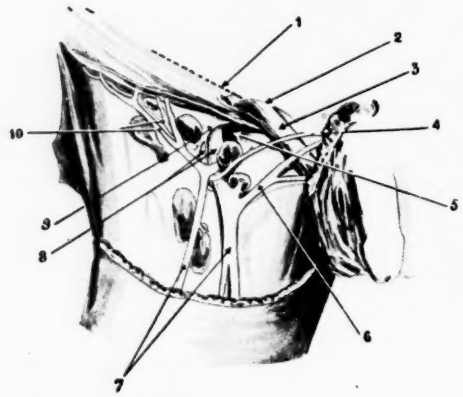
In order that this technic may be easily summarized and on the advice of my chief, Dr. Boulgakow, I present two contrasting sketches (Figs. 6 and 7). Figure 6 shows the normal anatomy of the inguinocrural region; Figure 7, the same region after displacement of the cord.

The cord, with its contents, the arteries accompanied by their sympathetic branches, the pampiniform venous packet and the lymphatics, will adapt itself well to its new situation. The vas deferens, padded with all these elements, wrapped up in the common serosa of the cord, itself reinforced by some still adherent fibers of the cremaster muscle, will not be exposed to trauma, the more so as it is laid down in the crural infundibulum, where it is further protected by Cloquet's ganglion and other structures.

On what bases do I claim that this operation is radical?

In none of our cases in which the patients were old men, on whom it is sometimes necessary to perform castration during kelotomy, has there been a recurrence of the hernia; and Berger has never observed recurrence of inguinal hernia in women, as in both types of patient the inguinal canal is hermetically closed.

The possible charge that this technic may increase the incidence of crural hernia is unfounded. By laying down the cord in the crural



THE INGUINAL AND SUBINGUINAL REGIONS IN THE NORMAL ASPECT.

1) The usual incision of the aponeurosis of the external oblique. — 2) Subcutaneous inguinal ring — 3) The spermatic cord — 4) Superficial external pudendal artery. — 5) Femoral canal. — 6) Superficial external pudendal vein. — 7) Great saphenous vein. — 8) Femoral artery and femoral vein. — 9) Superior horn of falciform margin. — 10) Superficial circumflex iliac vessels.

infundibulum I am only making up for that anatomic dehiscence which predisposes normally to femoral hernia and the elimination of which is a safeguard against recurrence.

In order to estimate the value of this procedure I have tried it in the most difficult cases, operating almost exclusively on old men and on patients who have had a second or a third recurrence. For example, I recently reoperated on a young man for three direct hernias which had occurred in spite of a graft from the fascia lata, applied at the time of his most recent operation (he had undergone three, in January 1946, January 1947 and December 1947 respectively). Again, I operated in the emergency case of a man aged 60 who was admitted to the hospital with a strangulated external oblique hernia after taxis had been performed to replace the herniated structures. I performed my operation, with spinal anesthesia, on the third day of his hospitalization. In this case I encountered an enormous epigastric artery, easily exceeding the caliber of a femoral artery.

I do not consider it necessary to employ this technic for children, in whom the classic procedure gives good results and is not followed by recurrence.

As yet I have not the proper perspective to draw conclusions, but I am confident that the technic is worth trying, since it gives both satisfaction to the surgeon and a sense of security to the patient.

SUMMARY

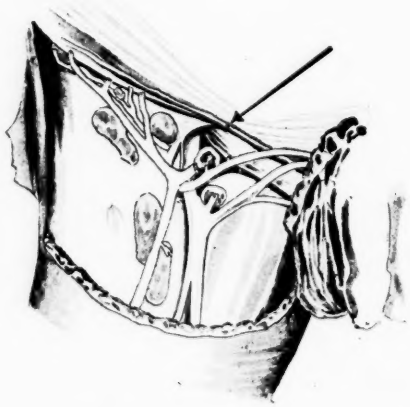
The author discusses a new procedure for surgical correction of inguinal hernia, involving elimination of the inguinal canal. He has made use of this procedure in the most difficult cases, and, although it has not been used long enough for the accumulation of conclusive statistics, he recommends it highly as presenting an advantage to both patient and surgeon.

RESUMEN

El autor discute un nuevo procedimiento para la corrección quirúrgica de la hernia inguinal. Ha hecho uso de esta técnica en los casos más difíciles y, aunque no ha sido empleado lo bastante para estadísticas concluyentes, la recomienda mucho tanto desde el punto de vista del paciente como del cirujano.

RÉSUMÉ

L'auteur discute une nouvelle procédure pour la correction chirurgicale de la hernie



THE NEW ASPECT OF THE INGUINAL AND SUBINGUINAL REGIONS.

The arrow shows the point of the reparation of the inguinal ligament. Look after the new position of the cord.

inguinale. Il a employé cette technique dans des cas très difficils. Néanmoins, il croit qu'elle n'a pas été employée assez longtemps pour donner des statistiques conclusives. L'auteur recommande cette méthode au point de vue du malade et du chirurgien.

RIASSUNTO

Discute un modo di procedere novello per la correzzione di ernia inguinale. Considera vantaggioso questo tecnico in casi i piu difficle, benché non sia in esistenza lungo per stastistica decisivo, l'A lo raccommanda fortemento al aspetto del paziente ed il chirurgo.

ZUSAMMENFASSUNG

Der Verfasser eroertert ein neues Verfahren der chirurgischen Behandlung des Leistenbruches. Er hat seine Technik in den schwierigsten Faellen ausgefuehrt. Obgleich das Verfahren noch nicht lange genug angewandt worden ist, um ueberzeugende Statistiken aufweisen zu koennen, wird es doch vom Verfasser—sowohl vom Standpunkt des Kranken als des Chirurgen—sehr empfohlen.

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Lag Screw Fixation of Femoral Neck Fractures

JOSEPH S. LUNDHOLM, M.D., F.A.C.S., F.I.C.S.
ROCKFORD, ILLINOIS

THE treatment of fractures in general has developed amazingly in the decade just past. It has more than kept pace with the large increase in fractures resulting from our modern way of life. Antibiotics and the application of mechanics to surgery have aided materially, and increasing knowledge of physiology has played no small part. Surgical correction and fixation have been accepted, and the results obtained have justified the acceptance. The comfort of the patient and the decreased incidence of ankylosed joints due to long periods of immobilization speak for themselves. Internal fixation, where applicable, is the nearest approach to the ideal treatment, and for fractures of the femoral neck this method enjoys wide popularity.

Surgeons are indebted to Smith-Peterson for establishing internal fixation of femoral neck fractures on a firm foundation, and also to Sven Johanson for presenting the cannulation of the three-flanged nail, which put the fixation operation within the range of every surgeon. Since then a large number of methods of fixation have been presented, and the choice lies largely in the individual surgeon's judgment, after due consideration of the physiologic advantages and disadvantages of the various methods. One must decide whether bone impaction is essential or advisable, or whether fixation without impaction is more desirable.

As is well known, in intracapsular fracture of the femoral neck nonunion may occur in spite of meticulous care and excellent treatment. In the majority of instances this is the result of destruction of or interference with the blood supply to the proximal fragment. But it is also known that in some instances, if the cardinal principles of good reduction and adequate immobilization are not fulfilled, nonunion is apt to result. Again, if an excessive number of bone cells are destroyed by impaction, nonunion is to be expected. Disruption of the blood supply is likely to occur because of the distribution of the supplying arteries, and, when the principle of impaction is employed in fixation, the physiologic factor plays an important part, because all bone cells destroyed by impaction must be absorbed.

The lag screw here presented (Fig. 1) fulfills the basic principles of surgical treatment by maintaining immobilization of the fragments without the added trauma of impaction and subsequent interference with the physiologic process of bone repair. The principle of the lag screw is not new—it has long been used in mechanical work, and its application to fracture treatment is logical and effective. The wide flange of the thread makes it possible to draw the two fractured surfaces together much more effectively and hold them in apposition much more firmly than with any other type of screw or nail. With accurate reduction of the fracture and with the lag screw holding the fragments firmly together there is no chance of rotation of the fragments, or of any angular movement. Impaction, which results in some loss of bone cells, is therefore not needed, and the result more closely approximates the ideal treatment.

The lag screw here described is so simple of construction and insertion that any surgeon can use it. It consists of one piece, complete in itself. It is constructed of nonmagnetic, nonelectrolytic molybdenum stainless steel and is supplied in varying lengths to accommodate femurs of varying size. The principle of drawing the two fragments together requires that all of the threaded portion of the screw must be contained within the proximal fragment. Careful study has revealed that the proximal fragment is never less than 1 inch (2.5 cm.) in length. Therefore the threaded portion of this lag screw is ¾ inch (1.91 cm.) in length, which suffices for all fractures of the femoral neck, regardless of the location of the line of fracture. The undersurface of the head of the lag screw is angled at 130 degrees, so that it can hold flush against the femoral shaft, and is also gnurled for the purpose of locking the lag

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screw on a bone plate when the latter is used. For intertrochanteric fractures, in which the cortex in the femoral shaft is insufficient for a firm purchase, I have devised a bone plate which can be slipped over the shaft of the lag screw and fastened to the femoral shaft; when the lag screw is then tightened down onto the bone plate, the gnurling locks the lag screw securely. The lag screw is also cannulated and is inserted over a guide pin. If the guide pin is properly placed (Fig. 2) the lag screw can be inserted over it with no fear of misdirection, and the guide pin cannot be sheared off by the lag screw. In all respects this lag screw conforms to all requirements recently laid down by the Veterans' Administration of the United States for metals to be used in the human body.

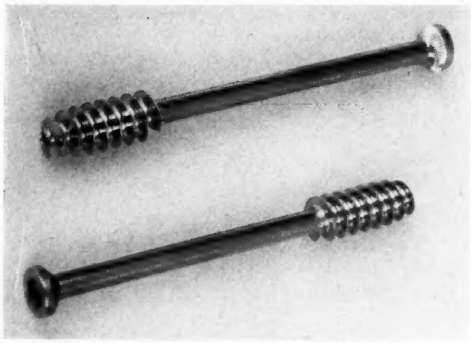

Fig. 1.—The Lundholm surgical lag screw.

TECHNIC

The patient is brought to the operating room after the usual preoperative medication and is placed upon either a fracture table or an ordinary operating table. If the latter is used, an orderly or an assistant sits at the foot of the table and holds the foot of the fractured leg in position after reduction has been accomplished. A roentgen film casette holder is placed under the pelvis, replacing part of the mattress of the operating table. The patient is then anesthetized, and reduction of the fracture is accomplished by the Leadbetter method or any other effective maneuver. A towel clip is anchored through the draping sheets and into the skin at a point midway between the symphysis pubis and the anterior superior spine of the ilium. This marks the midpoint above the head of the femur, and not only aids in the taking of anteroposterior roentgenograms but is valuable as a direction pointer during insertion of the guide pin.

A 3-inch (7.5 cm.) incision is made in the lateral surface of the thigh, commencing about 1 inch (2.5 cm.) below the greater trochanter. The incision is carried through the fascia lata and the muscle sheath, and the muscle is separated down to the femoral shaft. A drill is then used to pierce the cortex of the femoral

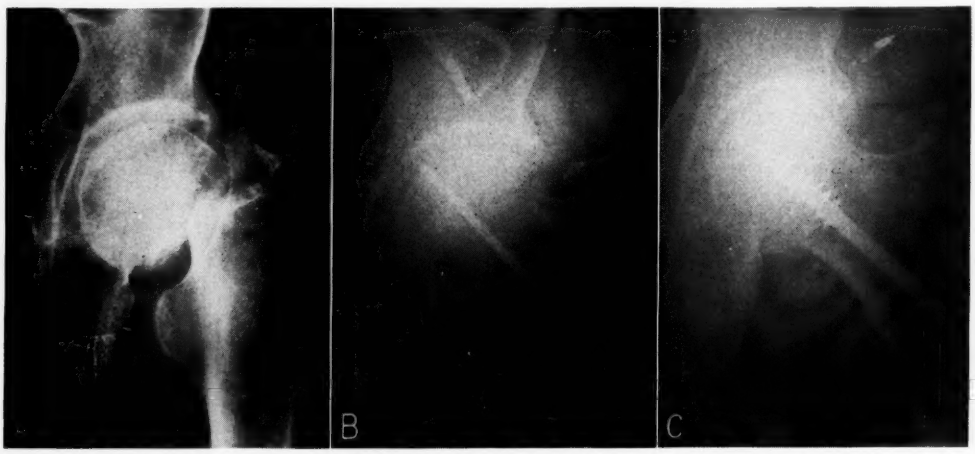

Fig. 2.—*A*, transcervical fracture. *B*, fracture reduced and guide pin in place. *C*, fracture held with lag screw in place.

shaft at the point selected, and directed towards the towel-clip marker. A guide pin is inserted through the drill hole and drilled into the proximal fragment, also directed in a line to the towel-clip marker. Roentgen films are then taken in both anteroposterior and lateral planes to ascertain whether the guide pin is accurately placed. If the placement is correct the length of lag screw needed is determined by measurement, with due consideration of the distortion caused by the focal distance of the roentgen tube from the film. The cannulated tap is then placed on the guide pin, and the thread is tapped through the cortex of the femoral shaft. The tap is withdrawn and the cannulated lag screw of proper length placed on the guide pin and screwed into position. As the lag screw passes from the cancellous bone of the femoral neck into the firmer bone structure of the femoral head near the cortex, the screw can be felt to grip into the bone, and the two fragments are felt drawing together when the screw is tightened. The guide pin is then withdrawn, roentgenograms are taken in both planes, and closure of the incision is effected in layers.

For intertrochanteric fractures, in which there is an inadequate amount of femoral shaft cortex for secure purchase, a bone plate is used to anchor the screw head to the femoral shaft, and the fracture is then held in fixation similar to that secured by a Blount blade or a Neufeld nail. The lag screw is inserted into position, the bone plate slipped onto the shaft of the screw and anchored to the femoral shaft with bone screws, and the lag screw tightened down.

The entire procedure of fixation seldom requires more than thirty or forty minutes, and the patient suffers little or no shock. The patient is returned to bed and made comfortable in any position desired. Routine care is given, and the patient is completely mobile in bed. In a day or two he is permitted to sit

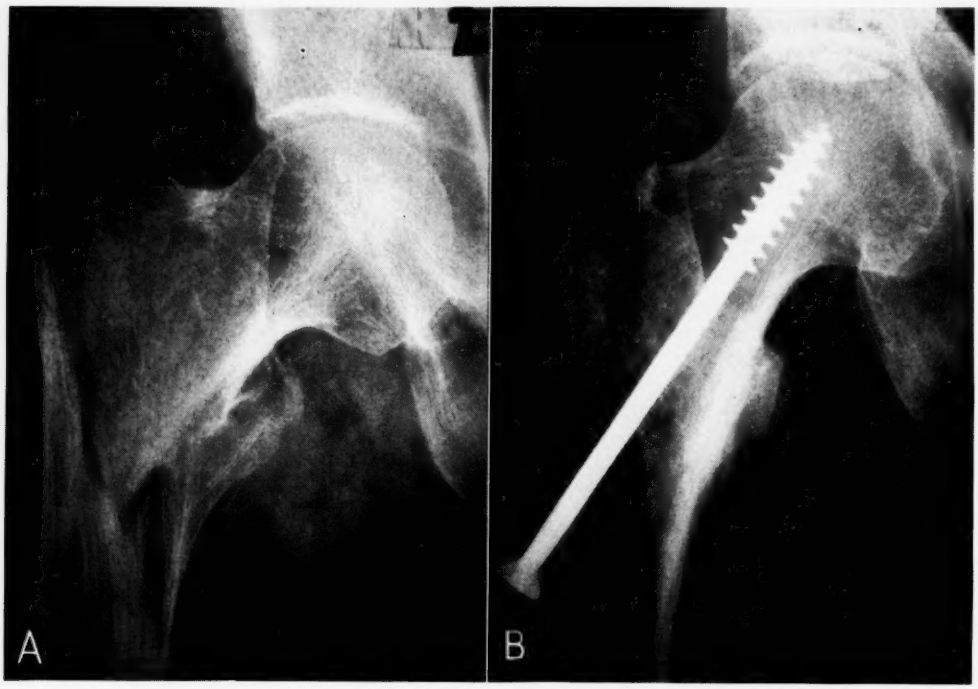

Fig. 3.—*A*, intertrochanteric fracture. *B*, fracture reduced and held with lag screw in place.

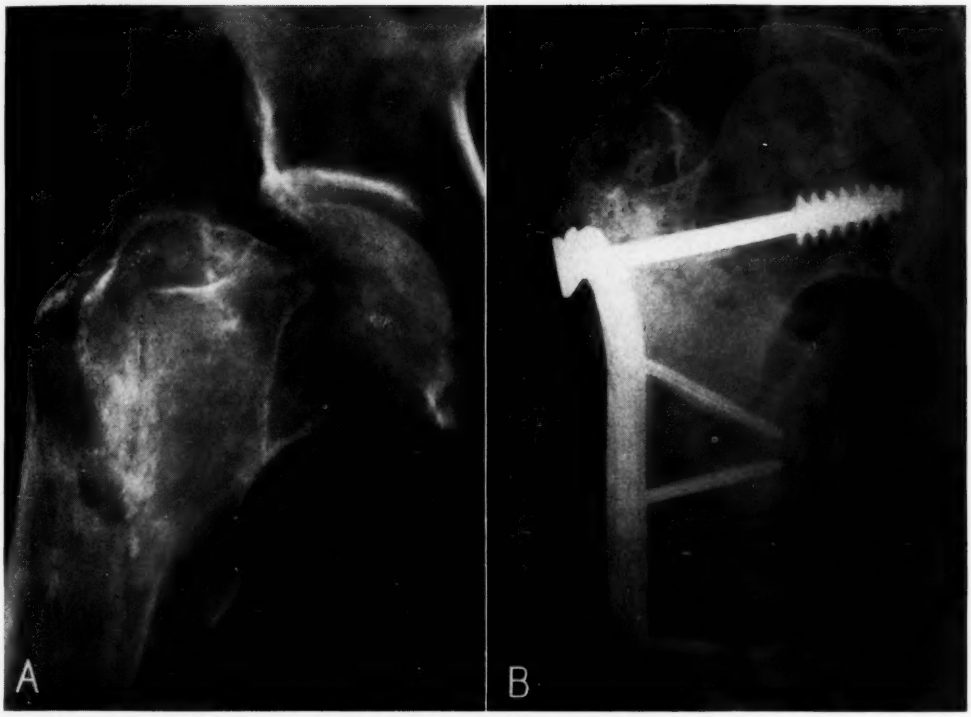

Fig. 4.—*A*, comminuted intertrochanteric fracture. *B*, fracture reduced and held with lag screw and bone plate.

in a chair and to use crutches. I do not permit any weight bearing on the injured leg for three months, but the foot may be put down on the floor in walking with crutches, for the purpose of steadying the patient as he walks (Figs. 3 and 4).

Compilation of results in a series of 57 consecutive cases with a minimum of one year for follow-up observation reveals some interesting statistics. There were 3 deaths, none of which were attributable to the hip fixation. One of the 3 patients who died was a white woman aged 78, who had nephritis, myocarditis and marked fibrillation on admission. She was obviously a poor risk, and I waited eight or nine days, hoping for an improvement. For a week after the fixation she was no worse; then the fibrillation became acute, anuria developed, and she died a cardiorenal death nine days after the operation. The second was a woman 75 years old, who had hypertension and diabetes mellitus. After the fixation she was permitted to be up in a chair for several weeks and seemed to be improving. Twenty-one days after the operation she went into diabetic coma and died. The third patient was a man 77 years old, who had marked hypertrophic prostatitis and nephritis on admission, and who was wearing an indwelling catheter. In this case fixation was postponed for nine days. After fixation the patient seemed comfortable and was completely mobile in bed. One week later cardiac decompensation developed, and he died a cardiorenal death.

Another interesting fact is that there were 5 cases (8.77 per cent) in which bone absorption occurred. In 3 of these cases bony union subsequently took place, with some shortening. In 2 cases (3.5 per cent) nonunion occurred; 1 of the patients had marked absorption, and a reconstruction operation was necessary. The other was an elderly woman with advanced arthritis. She refused to consider any corrective procedure and remains an invalid.

Analysis of Consecutive Cases

Total number of cases	57	
Subcapital fracture	5	(8.77%)
Transcervical fracture	27	(47.37%)
Intertrochanteric fracture	25	(43.86%)
Average number of days in hospital, all cases	21.81	
Average number of days in hospital, without complications	16	
Number of cases with absorption of neck and subsequent recovery with bony union	3	(5.27%)
Number of fractures resulting in nonunion	2	(3.50%)
Deaths from intercurrent conditions	3	(5.27%)
Deaths attributable to hip fixations	0	
Total complete recoveries	49	(85.96%)
Total recoveries with good function	52	(91.23%)

SUMMARY AND CONCLUSIONS

The simplicity of the lag screw described, the ease of insertion and the positive holding of the fragments all speak for themselves. The only special accessories needed are the bone tap and the screwdriver wrench. In fixation with this lag screw there is no loss of bone cells from impaction of the fragments, and the physiologic process of bone repair is not hindered. It is axiomatic that accurate reduction of fracture followed by immobilization without loss of bone cells is the closest approach to ideal treatment. In the author's opinion this treatment can be given by means of this lag screw with a minimum of trauma for the patient and a maximum of efficiency from the fixation splint.

RÉSUMÉ

La simplicite de la visse lagscrew est décrite ainsi que la facilité de son insertion et de sa fixation positive des fragments. Les seuls accessoires nécessaires sont un marteau et un tournevis à clef. Dans la fixation à l'aide de cette vis, il n'y a aucune perte de cellules osseuses due a l'impaction des fragments et la réparation physiologique de l'os n'est pas entravée. C'est axiomatique que la reduction de fracture suivie par l'immobilisation sans perte de cellules osseuses est le meilleur approche au traitement ïdéal. Dans l'opinion de l'auteur, l'emploi de cette vis (lag screw) entraîne un trauma minime pour le malade et un maximum d'efficacité de l'atelle fixatrice.

RIASSUNTO

La semplicita' di costruzione: la facilita' d'inserzione: la perfetta fissazione dei frammenti ossei rendono molto raccomandabile l 'uso di questo nuovo tipo di vite.

La fissazione dei frammenti evita la distruzione di cellule ossee che consequirebbe altrimenti alla pressione dei frammenti stessi, mentre non disturba il normale processo di guarigione della frattura. E' intuitivo che una riduzione accurata della frattura, seguita da un'immobilizzazione senza perdita di elementi ossei, rappresenta il metodo di cura ideale. La vite ideata dall'A. rende in molti casi quest'ideale una realta'.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Die Einfachheit der hier beschriebenen Zugschraube, die Leichtigkeit ihrer Einfuehrung und das sichere Zusammenhalten der Bruchstuecke sprechen fuer sich selbst. Alles was an besonderen Hilfsmitteln noetig ist, sind der Knochenvorbohrer und die Schraubenzieherkurbel. Bei der Bruchfixierung mit Hilfe dieser Schraube wird ein durch das Zusammenpressen von Bruchstuecken entstehender Verlust von Knochenzellen vermieden, und der physiologische Vorgang der Wiederherstellung des Knochens wird nicht behindert. Es ist ein allgemein anerkannter Grundsatz, dass die genaue Einrichtung eines Bruches mit nachfolgender Ruhigstellung ohne Knochenzellverlust einer idealen Behandlung am naechsten kommt. Der Verfasser ist der Meinung, dass

eine solche Behandlung mit Hilfe seiner Schraube unter minimaler Verletzung des Kranken und mit maximaler Wirksamkeit der Fixierungsschiene ausgefuehrt werden kann.

RESUMEN Y CONCLUSIONES

La simplicidad del tornillo lento descrito, la facilidad de inserción y el positivo mantenimiento de los fragmentos hablan por sí mismos. Los únicos accesorios especiales que se necesitan son el perforador óseo y el atornillador guía. En la fijación con este tornillo lento no hay destrucción de osteoblastos por el impacto de los fragmentos y no se trastorna el proceso fisiológico de reparación ósea. Es axiomático que la reducción exacta de la fractura, seguida de inmobilización sin destrucción de osteoblastos, es lo que más se acerca al tratamiento ideal. En opinión del autor, este tratamiento puede efectuarse con el tornillo lento, con trauma mínimo para el paciente y máximo de eficiencia en la fijación de los fragmentos.

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INTERNATIONAL COLLEGE OF SURGEONS

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Conduction Anesthesia in Control of Obstetric Pain and in Management of Cesarean Sections

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MEMPHIS, TENNESSEE

IN the year 1901, Sicard and Cathelin of France introduced the technic of extradural nerve block for surgical and neurologic procedures, using the approach of the caudal hiatus. In the same year Kreis of Germany first used spinal anesthesia in obstetrics. In 1909, Stoeckel of Germany imperfectly applied caudal analgesia in obstetrics. These were the first attempts to relieve the pain of parturition without systemic narcosis.

For more than twenty-five years this new approach to the control of obstetric pain by obliterating it at its site of origin was neither understood nor accepted by the medical profession. It was not until 1933 that Cleland published his classic studies on the afferent neurologic anatomy of the organs of parturition, which defined the pathways of pain from the uterus as special visceral afferent paths ascending from Frankenhauser's ganglion with the sympathetics of the aortic plexus through the dorsal route of the paired eleventh and twelfth thoracic nerves to the spinal cord. This disclosure, combined with the work of Sir Henry Head, defined the sixteen nerves which transmit the pains of uterine contraction, those associated with cervical dilation and distention of the perineum. From cephalad caudal these are the four lower thoracic nerves, the six posterior routes of the sacral plexus from the second through the fourth segments, including the parasympathetic ramifications, and the paired pudendal, perineal and hemorrhoidal nerves of the sacral plexus.

With an understanding of the anatomic picture involved it is possible, by means of various technics, to eliminate pain conduction in several or all of these nerves without seriously interfering with the motor innervation of the smooth muscle fibers to the uterus, which descend in the sympathetic nervous system from segments as high as the upper thoracic and midthoracic regions.

Local perineal infiltration, pudendal nerve block and presacral nerve block are satisfactory technics to relieve perineal pain only for delivery. Paravertebral nerve block as advocated by Cleland and aortic plexus block as advocated by Aubrel are satisfactory technics to relieve the pain of uterine contraction only. Spinal, continuous spinal and saddle block spinal anesthesia, caudal and continuous caudal analgesia, and lumbar peridural and continuous lumbar peridural anesthesia are satisfactory technics to eliminate all of the pains of labor. We have used these technics since 1940, and one of us designed continuous caudal and continuous peridural anesthesia.

In the United States today there is an ever-increasing application of all these technics in obstetrics, because it is realized that with them the baby is protected from transplacental narcosis, the mother is relieved of pain, and the amount of third-stage bleeding is diminished. A great many studies now confirm the fact that there is less maternal and infant mortality and morbidity when these technics are applied under standard conditions by those skilled in their use.

Since 1942, seventy-nine physicians in the United States have managed more than a 1,000 patients each with continuous caudal analgesia. Ten clinics have managed more than 3,000 each. The Chicago Lying-In Hospital and the Lewis Memorial Hospital have utilized saddle block spinal anesthesia in more than 4,000 cases. The Baltimore City Hospitals, under the direction of Doctor Louis Douglas, have managed more than 8,000 patients by saddle block anesthesias. Lull and Ullery of the Philadelphia Lying-In Hospital have managed more than 1,200 consecutive cesarean sections with continuous spinal anesthesia and no maternal mortality.

In addition to the 2,000 deliveries analyzed

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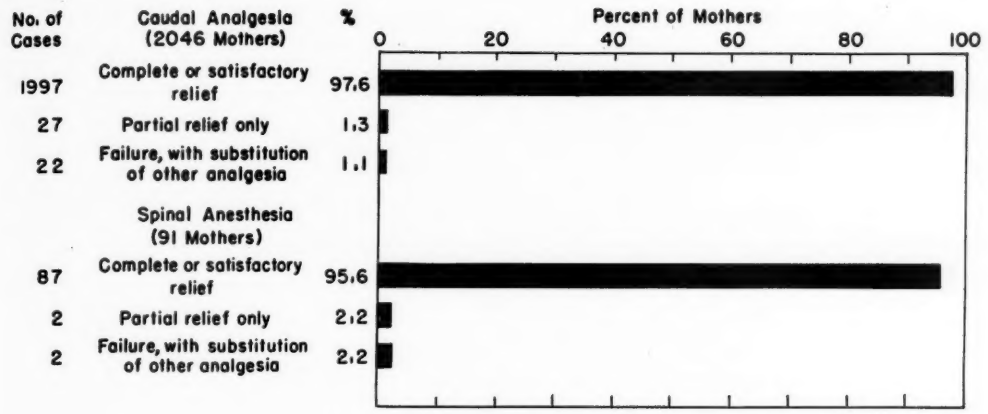

Fig. 1.—Data on caudal analgesia.

in this report, one of us (R.A.H.) has managed 12,000 additional deliveries with these technics in the Philadelphia Lying-In Hospital, the Staten Island Marine Hospital, the John Gaston Memphis City Hospital and the Johns Hopkins University Hospital.

With this wide development of conduction anesthesia methods it has been necessary to make a complete revision of the system of hospital management of patients during labor and delivery. This report of more than 2,000 deliveries with these technics is presented to define the teamwork necessary in the practice of obstetrics between doctors and obstetrical nurses. This particular team consisted of two senior obstetricians, two junior assistants, and three labor nurses who were first thoroughly trained in the principles of conduction anesthesia and obstetrics. Only the physicians initiate the nerve block anesthesia. They alone decide the optimum time in labor for the induction of this type of pain relief. The inductions have required an average of fifteen minutes per patient. The physicians are then relieved of the responsibility of subsequent injections by the nurse team, which regularly checks the blood pressure, the fetal heart tones, and the levels of conduction nerve block. The nurses work on a revolving schedule through the physicians' offices, which are in the same building and on the same labor floor, in the labor rooms, and off duty. When

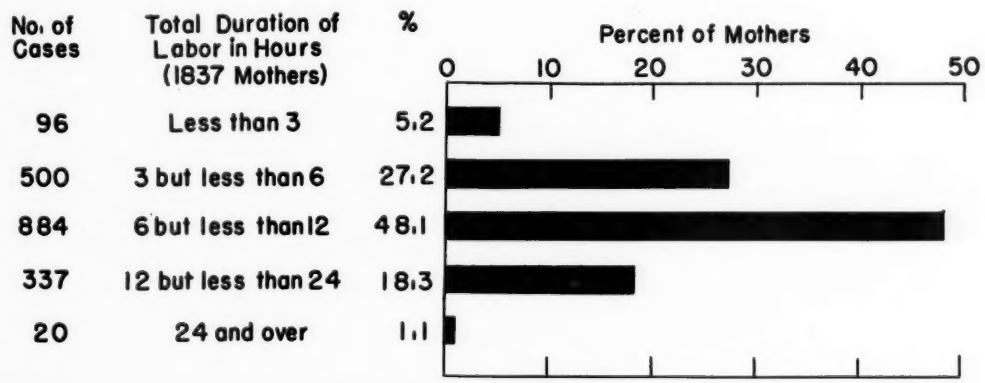

Fig. 2.—Data on duration of labor.

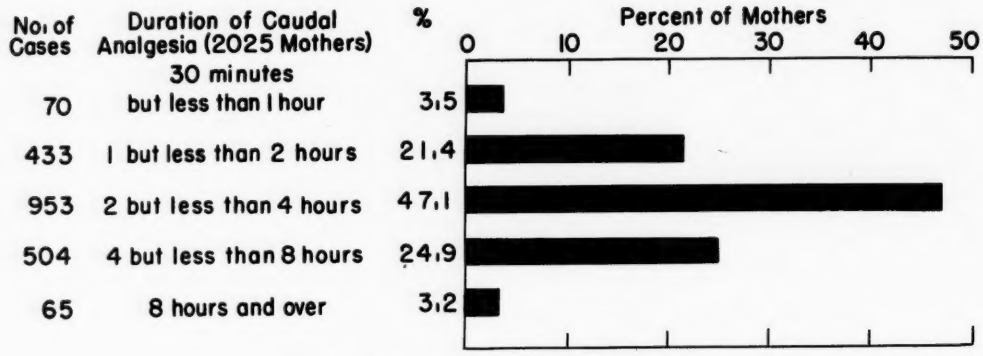
No. of Cases
Duration of Caudal Analgesia (2025 Mothers)
%
Percent of Mothers
0 10 20 30 40 50
70 30 minutes but less than 1 hour 3.5
433 1 but less than 2 hours 21.4
953 2 but less than 4 hours 47.1
504 4 but less than 8 hours 24.9
65 8 hours and over 3.2

Fig. 3.—Data on duration of caudal analgesia.

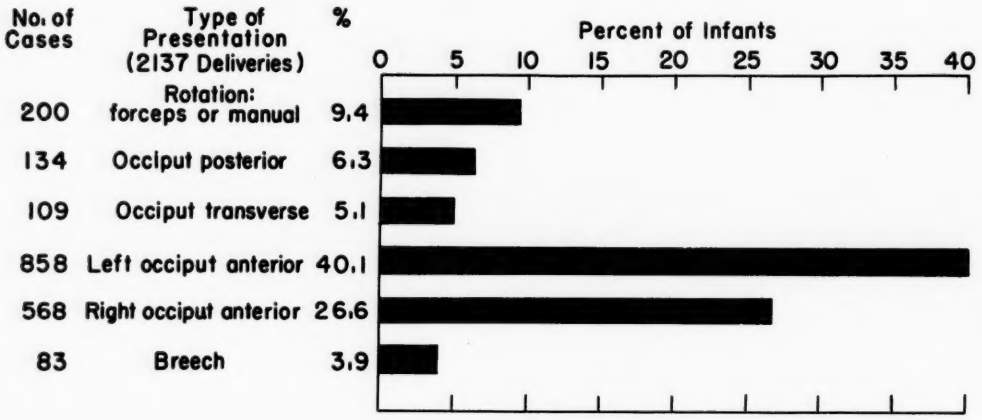
No. of Cases
Type of Presentation (2137 Deliveries)
%
Percent of Infants
0 5 10 15 20 25 30 35 40
200 Rotation: forceps or manual 9.4
134 Occiput posterior 6.3
109 Occiput transverse 5.1
858 Left occiput anterior 40.1
568 Right occiput anterior 26.6
83 Breech 3.9

Fig. 4.—Type of presentation.

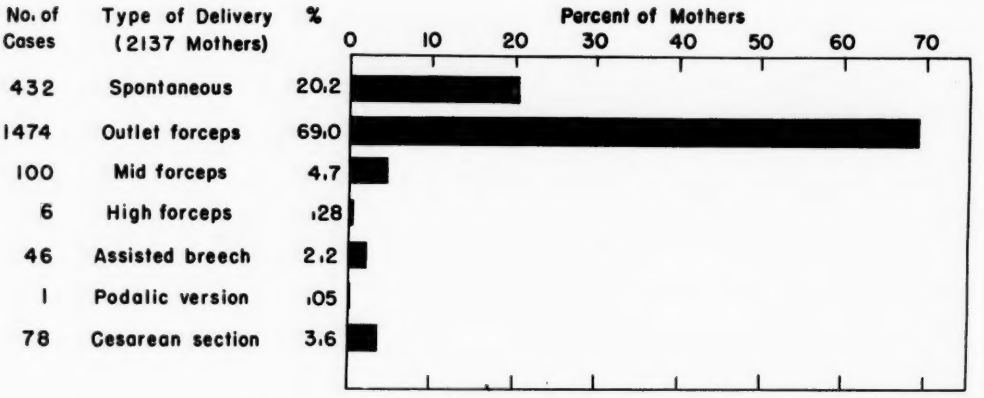

Fig. 5.—Type of delivery.

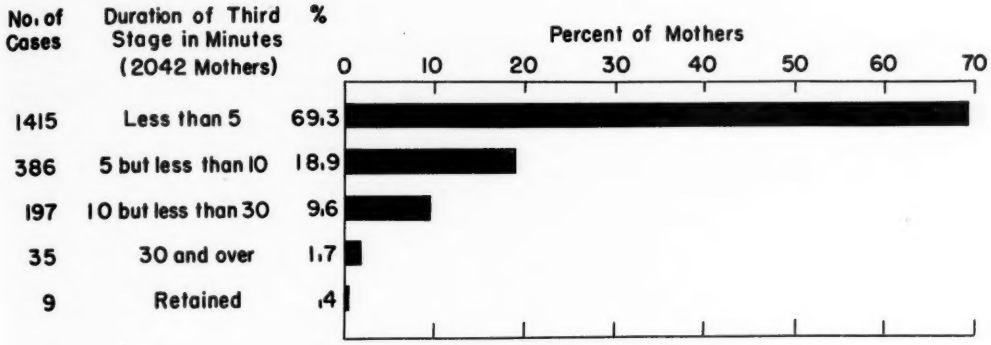
No. of Cases
Duration of Third Stage in Minutes (2042 Mothers)
%
Percent of Mothers
0 10 20 30 40 50 60 70
1415 Less than 5 69.3
386 5 but less than 10 18.9
197 10 but less than 30 9.6
35 30 and over 1.7
9 Retained .4

Fig. 6.—Duration of third stage of labor.

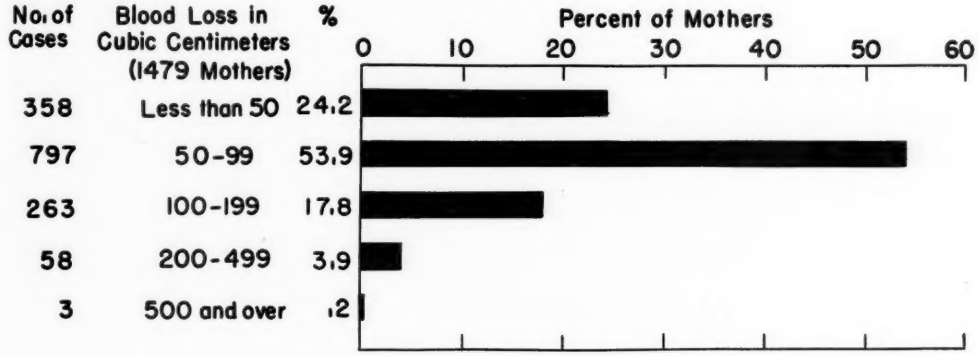
No. of Cases
Blood Loss in Cubic Centimeters (1479 Mothers)
%
Percent of Mothers
0 10 20 30 40 50 60
358 Less than 50 24.2
797 50-99 53.9
263 100-199 17.8
58 200-499 3.9
3 500 and over .2

Fig. 7.—Data on blood loss.

there are no patients in labor the nurse either works in the doctors' office or remains on first call duty for labor at home.

The senior obstetricians have office hours and are on call for delivery every other night and every other week-end. The junior obstetricians have the same schedule. This system has worked for four consecutive years, with essentially the same personnel, in such a manner that the average number of deliveries per month managed by this private service ranges from 70 to 100. The conduction nerve block technics have been used in more than 90 per cent of deliveries. There has been no maternal mortality. The uncorrected infant mortality of 1.9 per cent is approaching the irreducible minimum. This compares quite favorably with the infant mortality during the same period at the Methodist Hospital, where this entire series was handled.

In addition to checking the progress and maintaining the comfort of mothers in labor, the nurses maintain at all times sterile conduction anesthesia equipment, individually packaged and stored in bedside cabinets beside each labor bed. Nearly all of these labors have been conducted in the common hospital labor room, containing 5 beds. Simultaneously, other private patients and service patients are in labor in the same rooms under management with sedation and conduction nerve block technics. The use of these technics has facilitated and made more pleasant, for both physicians and nurses, the management of this large series of cases.

Early ambulation has been practiced in most

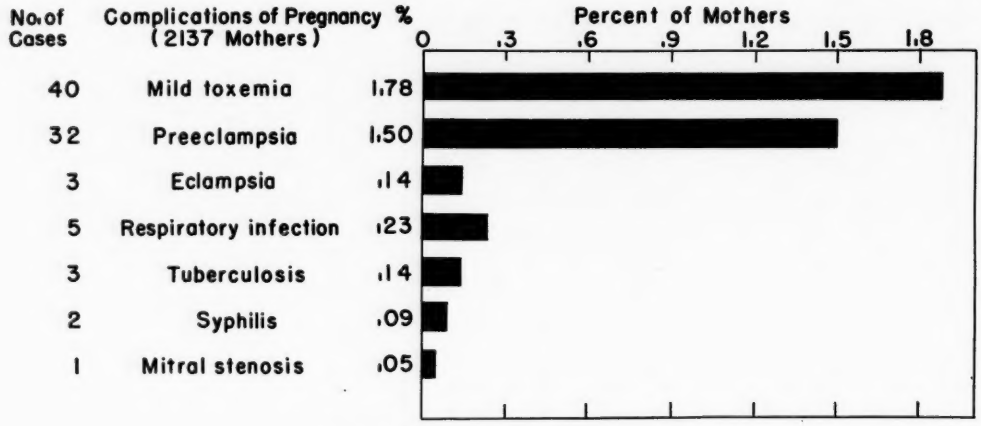

Fig. 8.—Complications of pregnancy.

of the series. Patients are permitted to sit up on the first day after delivery and to become ambulatory as desired from the second to the fourth day.

The most frequent complication encountered during labor in this series was the hypotension resulting from vasomotor conduction block. The use of vasopressor drugs, intravenous fluids, and autotransfusion by elevating the lower extremities at right angles to the long body axis have been sufficient to effect prompt restoration of the normal blood pressure. Available oxygen at the bedside is used to control nausea, which is sometimes encountered in labor and associated with conduction anesthesia. There have been no serious infections. There has been only one broken needle which is still *in situ* two years after delivery. It has produced no subjective or objective symptoms.

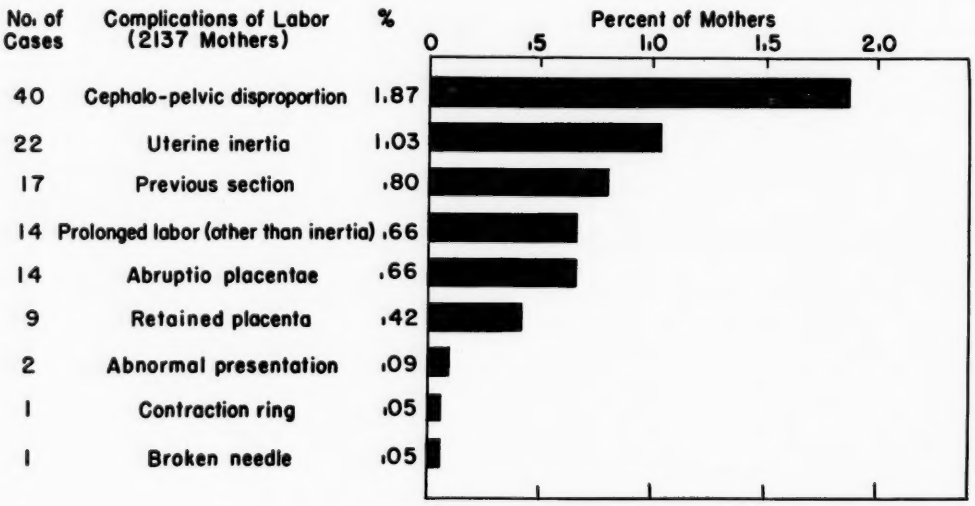
No. of Cases
Complications of Labor (2137 Mothers)
%
Percent of Mothers
0 .5 1.0 1.5 2.0
40 Cephalo-pelvic disproportion 1.87
22 Uterine inertia 1.03
17 Previous section .80
14 Prolonged labor (other than inertia) .66
14 Abruptio placentae .66
9 Retained placenta .42
2 Abnormal presentation .09
1 Contraction ring .05
1 Broken needle .05

Fig. 9.—Complications of labor.

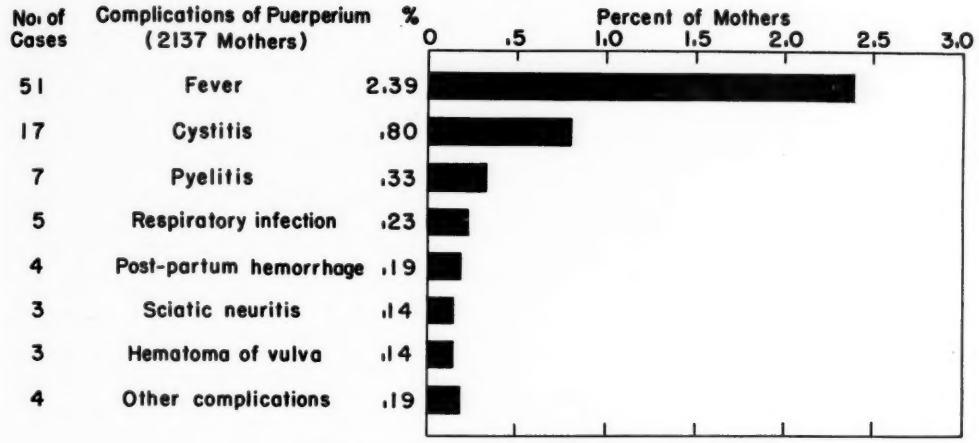

Fig. 10.—Complications of puerperium.

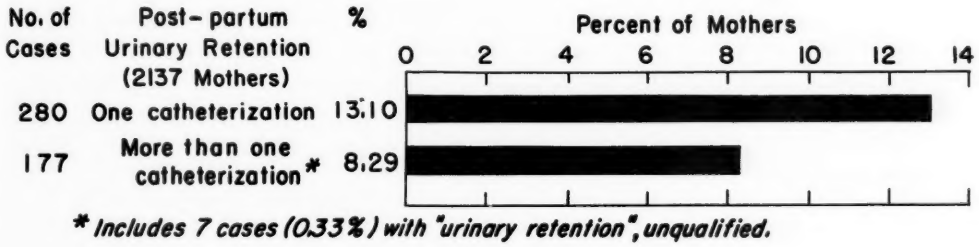
No. of Cases
Post-partum Urinary Retention (2137 Mothers)
%
Percent of Mothers
0 2 4 6 8 10 12 14
280 One catheterization 13.10
177 More than one catheterization* 8.29
* Includes 7 cases (0.33%) with "urinary retention", unqualified.

Fig. 11.—Postpartum retention of urine.

SUMMARY

The authors' experience emphasizes and confirms the reported successful use of conduction anesthesia in obstetrics throughout the United States. In their opinion, if these methods are correctly used there will be a reduction of infant and maternal mortality and morbidity, an expanding practice on the basis of satisfied patients and an orderly schedule and well-planned routine for the obstetrical team.

RÉSUMÉ

L'experience de l'auteur lui permet de confirmer les rapports satisfaisants de l'emploi de 1 anesthesie conductrice en obstétrique. Il est de l'opinion que si cette méthode est employée sagement, il y aura une réduction de mortalite et de morbidite de l'enfant et de la mère. Si la technique devient plus populaire, les malades seront plus satisfaits.

ZUSAMMENFASSUNG

Die Erfahrungen der Verfasser bestaetigen und bekraeftigen die Berichte von der erfolgreichen Anwendung der Leitungsanaesthesie in der Geburtsheilkunde ueberall in den Vereinigten Staaten und unterstuetzen ihre Ansicht, dass, wenn die Methoden richtig angewandt werden, eine Herabsetzung der Sterblichkeit und Morbiditaet der Saeuglinge und der Muetter erfolgen, die Praxis auf der Basis zufriedener Patienten sich ausbreiten und ein ordentliches Arbeitsschema und ein gutgeplantes Vorgehen der geburtshilflichen Arbeitsgruppen einsetzen wird.

RESUMEN

El autor señala y confirma el uso satisfactorio de la anestesia obstétrica en los Estados Unidos, ratificando su opinión de que, si los métodos son empleados correctamente, se obtendrá una reducción de la mortalidad y la morbilidad infantiles y maternas, expansión de la práctica sobre la base de pacientes satisfechas y una disposición ordenada y rutina bien trazada para el personal obstétrico.

RIASSUNTO

L' esperienza del 'A accentuà e conferma il successo di questo tipo d' anestesia impiegato nell' ostetrica dappertutto gli S.U. Confirmando loro opinione che risulterà in riduzione di mortalitá e morbiditá maternale e infantile.

La pratica spande su la base di pazienti soddisfatti ed inventorio regalato al corpo ostetrico.

Science and Religion

I see the human race engaged in the tremendous experiment of living on the planet called earth. From the point of view of humanity as a whole, the great aim of this experiment must be to make life more truly and more fully worth living; the religious man might prefer to say that the aim was to realize the kingdom of God upon earth, but that is only another way of saying the same thing.

The scientific spirit and the religious spirit both have their parts to play in this experiment. If religion will but abandon its claims to fixity and certitude (as many liberal churchmen are already doing), then it can see in the pursuit of truth something essentially sacred, and science itself will come to have its religious aspect. If science will remember that it, as science, can lay no claim to set up values, it will allow due weight to the religious spirit.

At the moment, however, a radical difference of outlook obtains as between change in science and change in religion. An alteration in scientific outlook—for instance the supersession of pure Newtonian mechanics by relativity—is generally looked on as a victory for science; but an alteration in religious outlook—for instance, the abandonment of belief in the literal truth of the account of creation in Genesis—is usually looked on as in some way a defeat for religion. Yet, either both are defeats or both are victories—not for particular activities such as religion or science, but for the spirit of man. In the past, religion has usually been slowly or grudgingly forced to admit new scientific ideas; if it will but accept the most vivifying of all the scientific ideas of the past century,—that of the capacity of life, including human life and institutions, including religion itself, for progressive development,—the conflict between science and religion will be over, and both can join hands in advancing the great experiment of man, of ensuring that men shall have life and have it more abundantly.

—*Julian Huxley*

Vaginal Hysterectomy in the Aged

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BROWNWOOD, TEXAS

A SEARCH of the literature reveals frequent mention of the fact that as a man ages his endoabdominal fascia tends to stretch, rendering him increasingly liable to hernia. Less frequent mention is made of the fact that this occurs also in aging women, usually as a result of some relaxation of the birth canal. Some authorities have stated that one in every three to five men beyond the age of 55 has some form of hernia. The same can be said of aging women, and the percentage is probably even greater.

The physiologic process of gestation and labor not only increases the probability of stretch of the endoabdominal fascia but is the cause of most hernias of the birth canal. The 65-year-old woman with a prolapse has usually had a large family without benefit of modern obstetric procedures. Modern anesthesia and analgesia were not available to her. Episiotomy was an unknown procedure. Repair was seldom done. It would be interesting to know how many young mothers of the present day will have large rectoceles or cystoceles or complete propalse at the age of 65. Very few, probably, as families are smaller and obstetric technic is greatly improved.

There remains, however, the need of effective procedures to relieve older women of such conditions as those aforementioned. Available procedures may be summed up as follows:

1. The La Fort procedure. This operation was useful in earlier days, when the risk of any other vaginal operation was unnecessary. Today it carries more risk than does vaginal hysterectomy.

2. The Watkins-Wertheim interposition operation. This has been widely used, but of late years it has been restricted to removal of the uterus. There are many reasons, which need not here be discussed, why it should not be used in the treatment of an elderly woman.

3. The Manchester operation. This also has no place in the treatment of the elderly, though for younger women it probably has its uses.

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Nonoperative procedures, such as the use of a doughnut pessary or a McIntosh support.

5. Vaginal hysterectomy. This procedure, which offers the lowest morbidity and mortality rates, will be discussed as the procedure of choice.

Advantages of Vaginal Hysterectomy.—Of vaginal hysterectomy, Potter has written: "As my experience increases, I am convinced that there is no other operation in gynecology that compares with its results." The advantages may be briefly listed here:

1. For all practical purposes the operation is extraperitoneal.

2. There is no abdominal incision; therefore no danger of hernia or wound infection is encountered, and gas pains are less likely to occur.

3. Other complications, such as pulmonary emboli and thrombophlebitis, are also unlikely, and the likelihood of pneumonia or atelectasis is lessened.

4. In a large percentage of cases a cystocele, a rectocele or urinary incontinence must be corrected; this correction can be combined with the hysterectomy and performed at one sitting.

5. The patient's stay in the hospital is shortened.

6. The patient, who is always a poor surgical risk, can undergo this operation with safety.

7. Postoperative discomfort is at a minimum. Most complaints are referable to the bladder or the rectum; postoperative backache is infrequent.

Historical Data.—Danforth has given a rather comprehensive history of the vaginal approach. Allowing for the possibility that it may have been performed in ancient civilizations, the first vaginal hysterectomy was performed by Paré in 1593, for prolapse. In his dissection and removal of the protruding tissues he inadvertently removed the uterus. The patient survived. Chenk (1600), Hunter of Scotland, Clark of Dublin, and Langenbeck

(1842) also performed successful operations. Many instances were reported between 1850 and 1882. The earliest American contribution was that of Samuel Chapin of Baton Rouge, Louisiana, in 1861[1]; his original report did not appear until 1867. In the early 1900's the abdominal route was preferred because it afforded opportunity for exploration and for removal of the appendix; the vaginal approach fell into some disrepute. Today, since it is known that there is no such thing as a "chronic appendix," all such meddlesome procedures are considered dangerous, and even if hysterectomy is done by the abdominal route the appendix is left alone unless it is diseased.[2] Hysterectomy by the vaginal route, however, is now established as a sound surgical procedure. Such men as Babcock, Tyronne, Heaney, and Kennedy have long maintained that it should be employed, whenever possible, in preference to the abdominal operation.

Indications.—The indications for vaginal hysterectomy are as follows:

1. Prolapse, either partial or complete.
2. Uterine bleeding (a frequent occurrence in the elderly).
3. Chronic cervicitis. (This is a very important indication. The cervix may have been extravaginal for years, and in many cases there are large ulcers. Even though there has been no bleeding in all this time, at the first show of blood the patient is alarmed.[4])

Technic.—In the United States, technic falls into two categories: operation with the use of clamps and operation without clamping. The Mayo technic, which involves the use of clamps to some extent but also requires replacement of the ligaments underneath the bladder to supply a pelvic floor, apparently is not used as widely as the method advocated by Heaney, which calls for preliminary clamping of the ligaments and vessels, immediate replacement of the clamp with a suture ligature and complete closure of the vaginal vault. The latter method produces less operative bleeding, and there is less chance of postoperative hemorrhage due to the slipping of ligatures. In addition, the immediate replacement of the clamp permits operation in a smaller field. A partial modification of this procedure has been used in my technic throughout, although during the war there was a period in which Heaney clamps could not be obtained; during this period the Mayo modification was used. With the Heaney clamp, vaginal hysterectomy can be performed with the greatest ease.

In detail, the technic of the operation is usually as follows: On the evening before it is to be performed, the patient is given a cleansing enema, after which sulfasuccidine or sulfaguanidine is instilled into the vagina, or the protruding parts are sprinkled with the drug. (In my experience this measure has aided considerably in lessening the probability of infection.) This completes the preparation of the cervix.

Types of anesthesia used are pudendal block, local infiltration, spinal anesthesia, sad-

Summary Record of 218 Vaginal Hysterectomies

Ages	Cases	Complications				
		Bladder	Rectum	Pelvic Abscess	Phlebitis	Death
60-65	102	0	1	1	1	0
65-70	52	2	0	0	0	0
70-75	36	0	0	1	0	0
75-80	22	0	0	1	0	0
Over 80	6	0	0	0	0	0
Total	218	2	1	3	1	0

dle block, inhalation anesthesia and intravenous anesthesia. In the series reported, the technic most frequently used was saddle block, which proved to offer the best relaxation with the highest degree of safety.

After the patient has been anesthetized and placed in the lithotomy position, the parts are scrubbed thoroughly with gauze, then dried and painted with tincture of merthiolate. The patient is draped, and every precaution is taken to insure asepsis. The cervical canal is closed by means of two Schroeder tenaculums, and the part is pulled down. Complete circumcision of the cervix is then done; the vesicocervical ligaments are pushed off the cervix, and the bladder is elevated. The posterior sac is pushed back and the cul de sac entered. A pack is placed in the cul de sac, pushing all the intestinal contents upward; then clamps are placed on each Machenrodt ligament. The suture ligature is applied. The clamps are removed and the suture left long.

Next, a clamp is placed on the broad ligament where the uterine artery is easily exposed, and another suture ligature is applied. The vessel is cut and the ligature cut short. After this has been done on each side there remains only a portion of the broad ligament, the round ligament and the tube. This is clamped; a suture ligature is placed and cut, the suture being left long.

The uterus is then removed and repair is started. For this I use a modified Heaney technic. The first suture is passed through the right edge of the anterior vaginal cuff; it takes a superficial bite or two in the denuded bladder, then picks up the anterior fold of the peritoneum about one-third of the distance from the lateral aspect. The peritoneum is included in other stitching down to the round ligaments and the ovarian pedicle. The suture is continued to include successively the stump of the uterine vessel, the sacrouterine ligament and the fold of peritoneum, after which it proceeds through the vaginal mucosa. This single suture, when pulled together, serves not only to close part of the vaginal vault but to improve hemostasis.

Similar stitching is done on the opposite side, and the peritoneum, after a thorough cleansing and sprinkling with a mixture of sulfanilamide and sulfathiazole, is closed with interrupted stitches.

If there is a cystocele to be repaired, this is done next before the lateral sutures are tied, as there is some difficulty in picking up the peritoneal flap. The repair completed, the vaginal cuff is closed with interrupted silk sutures. (This is a very important item. Until I began the use of silk approximately 1 of every 10 patients had considerable bleeding until about the tenth or twelfth postoperative day; since silk has been used, not one such instance has occurred. This suture is removed in the office six weeks to two months after the operation.) When the stitches have been placed, the two large sutures, one on each side, are tied. The closed edges of the cuff can be seen to have been pulled high into the vaginal vault. The tying of these sutures is followed by the posterior repair.

Postoperative Care.—One small pack is placed in the vagina, to be removed after about twenty-four hours. The patient is instructed to get out of bed and use the combinette on her first inclination to urinate, which occurs as a rule after eight or ten hours. Most patients are unable to void on the first trial and require catheterization. I use an indwelling catheter very seldom. In this series only 1 patient required it, and in her case there was injury to the bladder.

It is a standing rule that, when a patient is catheterized for the first time, 5 cc. of 2 per cent mercurochrome is instilled and left in the bladder. Few patients require catheterization after this procedure. Occasionally there is some irritation from the mercurochrome, but it is far less than that resulting from repeated catheterizations or the use of an indwelling catheter. In this series there were no residual symptoms after ten days, and in all but 3 cases the patient was able to void after the first catheterization.

My patients are allowed to be up after recovering from anesthesia. They are on their feet and walking as early as eight hours after the operation. Some have been invalids or semi-invalids for years because of the prolapsed uterus presenting between their thighs, and their delight at being rid of it has no bounds.

The perineum is cleaned and sprinkled with

one of the sulfonamides. The first bowel evacuation takes place about the third postoperative day (an enema may be given if required) and as a rule there is little need of special care of the perineum thereafter.

SUMMARY

Two hundred and eighteen cases of vaginal hysterectomy are reviewed; 212 of the patients were over 60 years of age, and 6 were over 80. There were no deaths. Complications were minimal. The pelvic abscesses drained through the vagina. Carcinomas were observed at biopsy in 7 cases. Injury to both bladder and rectum, where it existed, was repaired at the time of hysterectomy. No fistulas resulted.

In the author's opinion, vaginal hysterectomy in the aged carries little, if any, morbidity or mortality. It is total hysterectomy and prevents the subsequent development of carcinoma. It may be performed with only moderate anesthesia, and the patients are up early. Pulmonary complications are lessened and operating time considerably shortened.

RÉSUMÉ

218 cas d'hystérectomie vaginale sont passés en revue; dans 212 de ces cas, le malade avait plus de 60 ans, dans 6 plus de 80 ans. Il n'y eut aucune mortalité et les complications furent minimes.

Les abcès pelviens furentdrainés par la voie vaginale. Dans 7 cas le carcinome fut observé à la biopsie. Les lésions du rectum et de la vessie urinaire furent reconnues et réparées en même temps que l'opération.

L'hystérectomie vâginale chez les personnes agées entraîne peu et même point de mortalité ou de morbidité. C'est toujours une hystérectomie totale et cela elimine le développement subsequent du carcinome. L'opération peut se faire sous anésthésie légère; le malade devient ambulant plus tôt que les jeunes femmes; les complications pulmonaires sont rares et la durée de l'opération est considérablement abrégée.

ZUSAMMENFASSUNG

Zweihundertundachtzehn Faelle von vaginaler Hysterektomie werden kritisch besprochen. Zweihundertundzwoelf davon waren ueber sechzig und sechs ueber achtzig Jahre alt. Todesfaelle kamen nich vor, und die Zahl der Komplikationen war aeusserst gering.

Beckenabszesse entleerten sich durch die Scheide. In sieben Faellen wurde bei der Probeexision Krebs festgestellt. Verletzungen des Mastdarms sowohl als auch der Blase wurden erkannt und im Zuge der Operation repariert.

Die an aelteren Kranken vorgenommene vaginale Hysterektomie hat—wenn uberhaupt—eine nur geringe Morbiditaet und Mortalitaet aufzuweisen. Die Enfernung der Gebaermutter ist immer eine vollstaendige, und dadurch wird der spaeteren Entwicklung eines Krebses vorgebeugt. Die Operation kann unter maessiger Betaeubung ausgefuehrt werden. Die Kranken verlassen das Bett frueher als juengere Frauen. Lungenkomplikationen sind seltener und die Dauer der Operation wird erheblich abgekuerzt.

RIASSUNTO

L'A. passa in rassegna 218 interventi vaginale, di cui 212 in donne oltre 60 anni di eta', 6 oltre gli 80. Le complicazioni postoperatorie sono state minime, mentre non e' stato lamentato alcun esito letale.

Gli ascessi pelvici sono stati drenati attraverso la vagina. Le lesioni rettali e vescicali sono state riconosciute e riparate al momento dell'operazione. In 7 casi la biopsia ha rivelato un carcinoma.

L'A. conclude affermando che la morbilita' e la mortalita' dell'isterectomia vaginale sono minime anche nella pazienti in eta' avanzata. L'isterectomia dovrebbe essere sempre totale onde evitare il pericolo di successivi carcinomi del collo. L'operazione per via vaginale ha il vantaggio di richiedere un'anestesia meno profonda: di consentire un' esecuzione piu' rapido dell'isterectomia addominale. Il periodo di degenza e' minore: una piu' precoce deambulazione diminuisce ol'altra parte il pericolo di complicazioni polmonari.

RESUMEN

Se revisan 218 casos de histerectomía vaginal, 212 pacientes de más de 60 años de edad y 6 de más de 80. Mortalidad negativa. Complicaciones mínimas. Abscesos pélvicos canalizados por la vagina. 7 casos de carcinomas a la biopsia. Lesiones vesicales y rectales repara-

das al hacer la histerectomía. Fistulización negativa.

En opinión del autor, la histerectomía vaginal casi no presenta morbilidad o mortalidad en ancianas. La histerectomía es total y profiláctica del desarrollo subsecuente de carcinoma. Puede efectuarse con anestesia moderada solamente y levantar temprano a las pacientes. Disminución de las complicaciones pulmonares y acortamiento considerable del tiempo operatorio.

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Echoes of the Past

V. The Original Description of Thyrotoxicosis

Many men have contributed to the general knowledge of thyroid diseases. The first description of the clinical picture of thyrotoxicosis was offered in 1802. Although the author of this entity did not know the complete story of toxic goiter, he nevertheless wrote an excellent observational note:

"In a young Spaniard, after three years' residence in this country, appeared a tumor in the anterior part of the neck which in the course of four months increased to a considerable size. . . . He remained under treatment for seven months, not so much on account of the tumor as on account of the difficulty he had in breathing and on account of an extraordinary palpitation in the region of the heart. . . . The young man realized the seriousness of his condition and applied for relief regarding reduction or removal of the tumor, as it seemed to him that the pressure of the tumor on the subjacent parts was increasing the difficulty he had in breathing. . . . At the examination of the tumor I found it of considerable size and as if divided into two parts by a kind of fissure. It presented externally the natural color, only the veins were turgid . . . as if varicose; it was not painful to the touch, though pressure on it, with the fingers, rendered respiration more difficult. He was emaciated. The pulse was regular but not febrile.

"The thyroid gland was certainly the seat of the trouble. . . . The curative treatment had to be directed to the resolution of the stagnant tumor. For this purpose I applied a double compress saturated with cold vinegar strengthened by a dose of sal ammoniac. This, after twenty days, visibly decreased the tumor by at least one third; the patient breathed with less difficulty. . . . Besides this I had him apply during the night a strip of linen of the width of the tumor, with a liniment. . . . I obtained the complete resolution of the tumor in four months. All the symptoms which accompanied the trouble diminished in proportion to the diminution of the tumor. The palpitation disappeared and he soon took up again his occupation as painter, which he practiced until he left Rome, five years after the cure."

The above paragraphs are taken from, "Collezione d'osservazioni, e reflessioni di chirurgia, 1802." Joseph Flaiani (1741-1808) was the author of the description. He was an outstanding surgeon and anatomist of his day. Founder of the anatomic museum of the Hospital of the Holy Spirit in Sassia, he was a most skillful surgeon with an excellent practice.

In Continental Europe, as a recognition of his priority in describing exophthalmic goiter, this clinical entity is often referred to as Flaiani's disease.

—Bernard J. Ficarra, M.D., F.I.C.S.

Plastic Surgery of the Nose and Chin

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IN the entire field of plastic surgery the most common facial deformities are those of the nose[1] and chin,[2] which have been described in former publications. It is the purpose of this paper to supplement the previous ones with certain phases and changes of technic which have proved to be of value in the plastic correction of these deformities.

Routine Rhinoplasty.—Various rhinoplastic technics are employed by the different schools of rhinoplastic surgery. Each has its merits, and the end results depend largely upon the skill and experience of the surgeon.

The problem of rhinoplasty in cases of vasomotor rhinitis is worthy of thought and discussion. In routine rhinoplasty (Figs. 1 and 2) the nose is narrowed by means of bilateral lateral osteotomy, by detaching the upper lateral cartilages from the septum and by narrowing the nasal tip. This results in diminished aeration of the nasal chambers. It has been pointed out that, if rhinoplasty and submucous resection are performed concomitantly in cases of mild or moderate vasomotor rhinitis, marked physiologic improvement may be anticipated in most instances. Hypertrophied, boggy turbinates have been conservatively treated and their size diminished by repeated submucous electrocoagulations. The final results of treatment by this method were gratifying but involved a number of postoperative office treatments, with additional discomfort for the patient. In an attempt to eliminate these treatments, more aggressiveness and daring was displaced by sacrificing the entire tip of one or both inferior turbinates if they were chronically hypertrophied and obstructive. If the other turbinates were hypertrophied they were fractured laterally to increase ventilation. The results of radical anterior turbinectomy performed in combination with submucous resection and rhinoplasty in allergic noses is gratifying. The noses stayed clean. No unusual crusting occurred. Sneezing and watery discharge diminished considerably, and the patients remained comfortable, having been relieved of their nasal symptoms.

Postoperative Nasal Packing.—At the completion of a routine simple submucous resection and rhinoplasty one is concerned with nasal packing. The procedure of employing a large amount of petrolatum gauze as a pressure dressing on the nasal septum to maintain the mucoperichondrial flaps in place and diminish bleeding has been discarded. Instead, only a very small pledget of petrolatum gauze is inserted into each nostril. When a large amount of this gauze is removed from the nose it is quite common to encounter epistaxis in varying degrees. This involves additional discomfort for the patient and loss of time for the surgeon in waiting for the bleeding to subside. If only a small pledget is removed from a nostril, bleeding is rare. It seems logical to conclude that a considerable number of submucous septal hematomas would develop without a pressure dressing on the septum. Actually, not a single one has occurred in several hundred cases.

An exception is made in the method of postoperative packing, however, in cases of severe deflection of the nose. A surgical method of correcting deflected noses which has worked well is as follows: A typical routine rhinoplasty is performed so that the profile projection, tip narrowing and elevation are satisfactory, no particular heed being paid to the nasal deflection. A mildly deflected nose (Fig. 3) may be repositioned by this maneuver alone. A typical submucous resection is performed if necessary (I perform it concomitantly in about 80 per cent of cases, since exostoses or ecchondroses which may have been symptomless prior to rhinoplasty may become obstructive after the operation).

A moderate or severely deflected nose requires additional procedures. Double or triple saw cuts are made on the broad site in performing the lateral osteotomy, while only a single complete saw cut is made on the narrow

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side. The maneuver of first fracturing outward (Aufricht) and then forcefully manipulating inward will straighten almost any bony deflection (Fig. 11). Occasionally one has to disarticulate the bony septum from the nasofrontal angle[1] before the bony framework of the nose can be pushed to the midline and straightened.

A nose twisted because of an angulation of the septal cartilage may be corrected by the methods advocated by Berson,[3] Peer,[4] or Seltzer.[5] In recent years I have corrected almost every deflection, no matter how severe, by routine rhinoplasty and radical thorough submucous resection (Figs. 4 and 9). After the final shape of the nose has been determined by rhinoplasty, a thorough submucous resection is performed, approximately ⅛ inch (0.32 cm.) of septal cartilage being left on the dorsum and about ¼ (0.64 cm.) at the anterior free end. If the remaining anterior free end of the septum is displaced, it is cut through at its junction with the vomer (by a straight scissors cut going through the cartilage and mucoperichondrium on both sides of the septum). The anterior free end of the septum is respositioned in the midline and resutured to the columella. The resilience of the remaining dorsal septal cartilage is not broken. It has a tendency to recoil somewhat to its original displaced position. However, since most of the cartilage has been removed, the recoil is only partial. The septum is then placed in the midline and maintained in the straight position by overpacking the side on which the deflection occurred with petrolatum gauze. A small pledget of the gauze is inserted in the opposite nostril. The nose is splinted in the midline by adhesive strapping, and a stent is applied. The small nostril pledget is removed on the third day and the large bulky packing on the seventh day. The stent and the adhesive strapping are removed on the tenth day. Enough fibrous adhesions will form to maintain the septal cartilage in the midline.

When a very large hump is removed or a

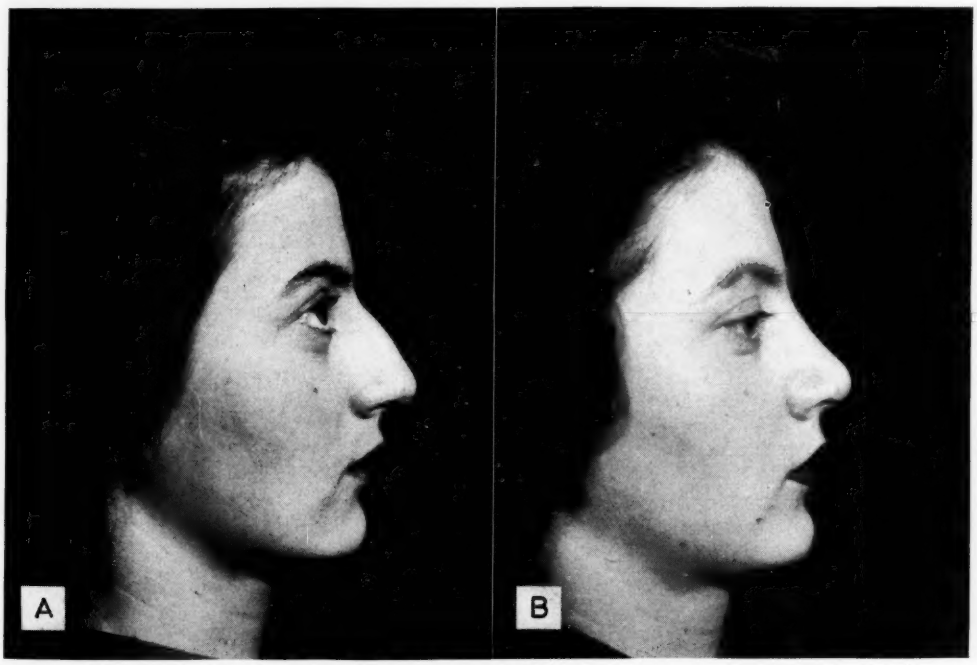


Fig. 1.—*A*, preoperative photograph; *B*, photograph taken after rhinoplasty.

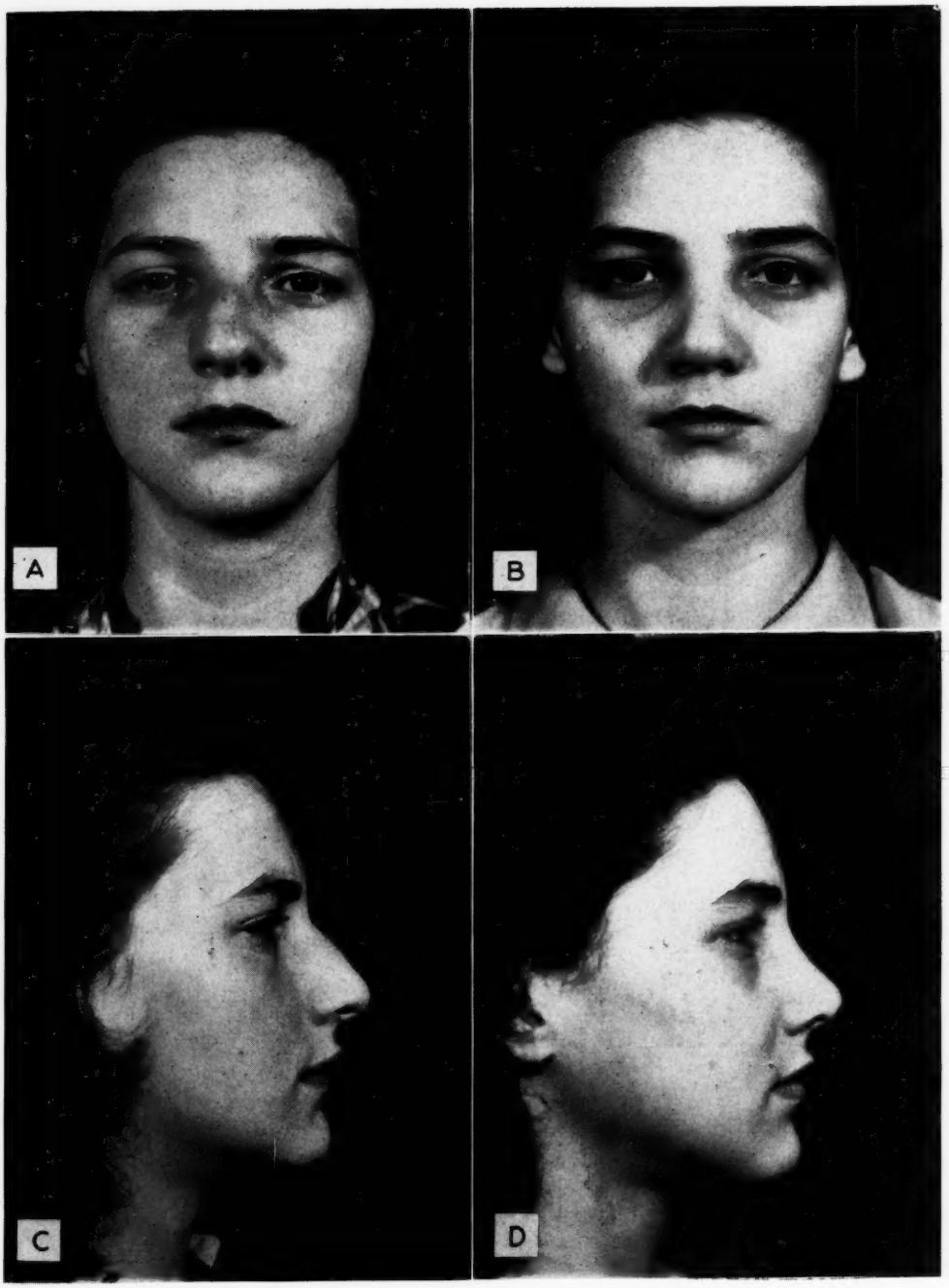
Fig. 2.—*A*, preoperative photograph; *B*, photograph taken after rhinoplasty.

very prominent nose reduced, a considerable amount of excess skin remains on the dorsum of the upper two-thirds of the nose. A subcutaneous pocket is formed in which hematomas may occur. Several weeks must elapse before this excessive quantity of skin shrinks and assumes the modeled operative proportions. A method of hastening the shrinking procedure and preventing hematomas and excessive edema is to employ a pressure adhesive tape dressing for better molding of the skin over the bony and cartilaginous framework of the nose (Fig. 5).

After all the blood has been expressed from the nose, the columella resutured to the anterior free end of the septum and the nostrils packed, the lobule is compressed to squeeze out any remaining novocaine. A thin piece of adhesive tape is employed to hold the tip upward and maintain its narrowness (Aufricht[6]). Wider pieces of adhesive tape are then placed in a transverse direction, beginning at the nasofrontal angle and extending down the dorsum of the nose to the lower lateral cartilages. The strips are placed on the nose with considerable pressure, which forces the skin to fit snugly across the remodeled dorsum of the nose. When the adhesive tape is applied with pressure in this manner the upper half of the dorsum of the nasal tip appears too prominent. A thin piece of adhesive tape backed in the middle by adhesive (Aufrich[6]) is placed over the prominent point to depress it and make it conform with the remodeled nose.

A stent is then applied over the nose. With this method of nasal dressing it has been found

Fig. 3 (opposite).—*A*, preoperative photograph showing mildly deflected nose. *B*, photograph taken after rhinoplasty and radical submucous resection. *C*, preoperative profile. *D*, profile after operation.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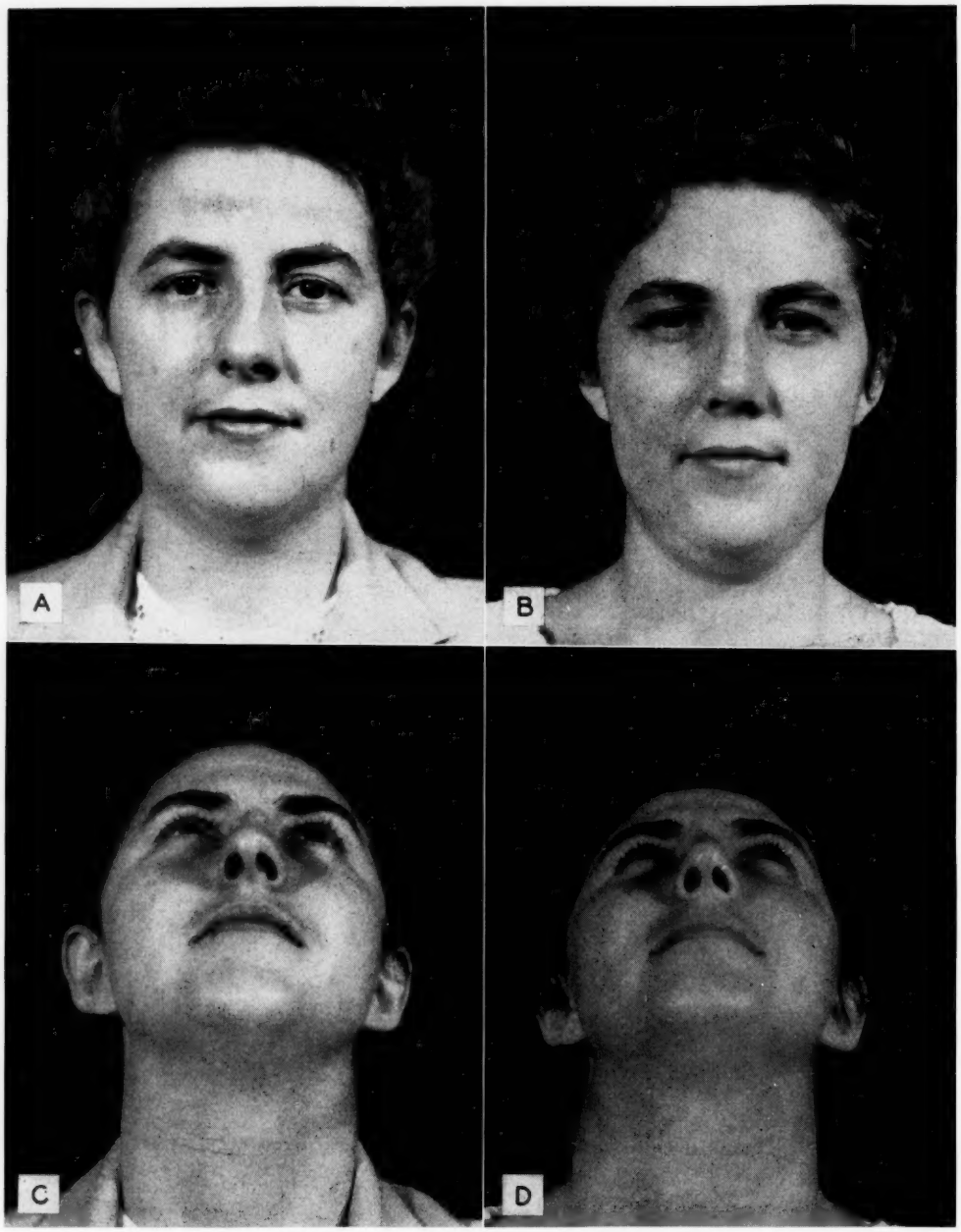

Fig. 4.—*A*, preoperative view showing deflection of septal cartilage. *B*, photograph taken after rhinoplasty and radical submucous resection. *C*, preoperative anterior view. *D*, appearance after operation.

that postoperative ecchymoses and edema are considerably diminished. The skin shrinks down faster and the nose assumes its final form more rapidly. However, edema occasionally occurs over the glabella, where pressure strapping is impossible.

Deformities of the Chin.—Chin deformities are very common congenital malformations. It is not uncommon to find deformity of both chin and nose in the same patient, and in most instances they can be advantageously corrected at the same operation (Figs. 8 and 10).

The use of preserved cartilage has been condemned by some plastic surgeons on the basis of microscopic evidence of absorption of the cartilage. The amount of absorption is an important consideration when only small bits of preserved septal cartilage are employed. Clinically I have observed that more absorption takes place in preserved septal cartilage than in preserved rib cartilage. Furthermore, when large pieces of preserved rib cartilage are employed it makes little difference in the final form whether or not microscopic absorption takes place. The final form is not altered sufficiently to cause changes in the contour. Sixty large implants were made in chins for microgenia, and, after observation for as long as seven years, only negligible changes have been noted.

On occasion, the preserved cartilage chin implant was displaced soon after the tight immobilization adhesive tape chin strapping was removed. In an attempt to prevent this occurrence, the patients are now instructed to wear a commercial chin strap for several weeks after the adhesive dressing is removed. They are advised to wear these straps when sleeping, so that no accidental self-inflicted displacement will occur.

The chin strap employed is the "double chin strap" sold over the cosmetic counter of most drug and department stores (Figs. 6 and 7). The straps are worn by all male patients over the adhesive chin dressing, since adhesive tape does not adhere to the male beard.

The chin strap is also recommended as an effective dressing after various operations on the chin:

1. As a pressure dressing over adhesive tape after skin grafting operations on the chin.
2. As a substitution for a Barton bandage in the management of certain fractures of the jaws.
3. As an added immobilization bandage after operations for prognathism.
4. As a pressure dressing after "T plastics" on the chin for double chin deformities.
5. As a pressure dressing after surgical remodeling of reconstructed chins.
6. As a pressure dressing on severe undercut lacerations of the chin.
7. As a pressure dressing after "V excision" of the lip for carcinoma.

Fig. 5.—Pressure adhesive tape dressing. *A*, narrow piece of adhesive tape across tip of nose (Aufricht). *B*, wider strip across dorsum. *C*, narrow strip of adhesive tape backed by adhesive to depress prominent tip (Aufricht).

Fig. 6.—*A*, preoperative view showing prominent nose and receding chin. *B*, photograph taken after rhinoplasty and chin plastic. *C*, preoperative anterior view. *D*, appearance after correction.

Fig. 7.—Sister of patient in Figure 6. *A*, preoperative view showing prominent nose and receding chin. *B*, photograph taken after rhinoplasty and chin plastic. *C*, patient wearing commercial double chin strap. *D*, another form of commercial double chin strap.

Fig. 8.—*A*, preoperative view showing prominent nose and receding chin. The patient had previously undergone a rhinoplastic operation. *B*, photograph taken after second rhinoplasty and preserved cartilage chin implant. *C*, preoperative view; *D*, photograph showing result.

8. As a pressure dressing after a suprahyoid disection of the neck.

9. As a pressure dressing after skin grafting of the gingivolabial sulcus.

10. As a pressure and immobilization dressing after bone grafts to the chin.

SUMMARY AND CONCLUSIONS

Radical resection of one or both tips of the anterior turbinates is advocated in cases of moderate or severe vasomotor rhinitis when the turbinates are chronically hypertrophied and obstructive. The results of radical anterior turbinectomy performed together with submucous resection and rhinoplasty in patients with vasomotor rhinitis is gratifying.

Small pledgets of petrolatum gauze inserted in the nostrils rather than in the nasal chambers themselves after submucous resection and rhinoplasty is more efficacious than bulky packing inserted into the nose.

Almost any deflection of the nose can be corrected by routine rhinoplasty together with radical and thorough submucous resection.

A pressure adhesive tape dressing applied under a stent diminishes postoperative ecchymosis and edema and enables the nose to assume its final form more rapidly.

A chin strap is recommended to help prevent displacement of chin implants. This strap may also be employed after various other plastic operations on the chin.

RÉSUMÉ

La résection radicale d'un ou des deux bouts des cornets inférieurs est recommandée dans les cas de rhinites vasomotrices modérées ou sévères quand les cornets sont chroniquement hypertrophiés et obstructifs. Les résultats de turbinectomie inférieure radicale accompagnée d'une résection submuqueuse et de rhinoplastie chez les malades souffrant de rhinite vasomotrice sont très satisfaisants.

Des petits cordons de gaze pétrolisés insérés dans les narines plutôt que dans la chambre nasale apres résection submuqueuse et la rhinaplastie sont plus efficaces que des tamponnements massifs introduits dans le nez.

Presque toute déflection du nez doit être corrigée par une rhineplastie ordinaire avec résection submuqueuse radicale et entière.

Une pression à l'aide de gaze appliqueé comme une tente, diminue l'ecchymose et l'édème postoperatoire et permet au nez de prendre sa forme finale plus rapidement.

Un soutien est recommandé pour empêcher le déplacement de greffes mentonniéres. Ce support peut etre employé aprè différentes opérations plastiques sur le menton.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

In Faellen von maessigem oder schwerem vasomotorischem Nasenkatarrh wird die radikale Spitzenresektion einer oder beider vorderen Nasenmuscheln empfohlen, falls die Muscheln chronisch hypertrophiert sind und Verstopfung verursachen. Die Ergebnisse, die mit radikaler vorderer Muschelresektion in Verbindung mit submukoeser Resektion und Rhinoplastik bei Kranken mit vasomotorischem Nasenkatarrh erzielt wurden, sind erfreulich.

Die Einfuehrung von kleinen Vaselingazetampons in die Nasenloecher und nicht in die Nasenhoehlen selbst ist nach submukoeser Resektion und Rhinoplastik wirksamer als das Ausstopfen der Nase mit dicken Packungen.

Fast jede Verbiegung der Nase kann mit gewoehnlicher Rhinoplastik in Verbindung mit radikaler und sorgfaeltiger submukoeser Resektion ausgeglichen werden. Ein Heftpflasterdruckverband verringert postoperative Ekchymosen und Oedem und gestattet der Nase eine beschleunigte Annahme ihrer endgueltigen Gestalt.

Eine Kinnbinde wird zur Vorbeugung der Verschiebung von Kinnimplantaten empfohlen. Diese Binde kann auch nach verschiedenen anderen plastischen Kinnoperationen Anwendung finden.

RESUMEN Y CONCLUSIONES

La resección radical de una o ambas extremidades del cornete anterior está indicada en casos de rinitis vasomotora moderada o severa, en que los cornetes se encuentran crónicamente hipertrofiados y obstruidos. Son satisfactorios los resultados de la resección radical con resección mucosa y rinoplastía en pacientes con rinitis vasomotora.

Pequeñas compresas de gasa vaselinada introducidas en las ventanas nasales mejor que en las fosas nasales, después de la resección mucosa y rinoplastía, son más eficaces que el gran taponamiento intranasal.

Fig. 9.—*A*, preoperative view showing deflection of septal cartilage. *B*, photograph taken after rhinoplasty and radical submucous resection. *C*, preoperative appearance. *D*, appearance after correction.

Fig. 10 (opposite).—*A*, preoperative view showing dishface deformity; depressed nasal tip and receding chin. *B*, photograph taken after routine rhinoplasty and preserved cartilage chin implant. *C*, preoperative anterior view. *D*, appearance after correction.

A
B
C
D

Fig. 11.—*A*, preoperative view showing bony deflection of nose. *B*, photograph taken after rhinoplasty and radical submucous resection. *C*, preoperative profile; *D*, profile after operation.

Cualquier desviación de la naríz casi puede corregirse con la rinoplastía de rutina, junto con la resección mucosa radical.

Un apósito aplicado con vendaje adhesivo compresivo disminuye la equimosis y el edema postoperatorios, siendo más rápido el proceso para que la naríz adquiera su forma final.

Se recomienda un vendaje de la barba para ayudar a prevenir desplazamiento de injertos de la misma. Este vendaje puede emplearse también después de otras diversas operaciones plásticas de la barba.

RIASSUNTO

Pone in evidenza la risezione radicale d'un od ambedue punte turbinati anteriori in casi di rinite vasomotore sia moderato o severo, quando i turbinati sono ipertrofici ed ostruttivi. I risultati del turbinettomia radicale anteriore insieme al risezione sottomucosa e rinoplastia sono gratificanti.

L inserzione di piccoli pezzi di tocca a petrolatum inseriti nelle narici, piuttosto che nelle camere nasali dopo risezione sottomucosa e rinoplastia e' piu efficace del imballaggio voluminoso del naso.

Quasi ogni flessione del naso puo essere corretto per pratica rinoplastica insieme a la risezione perfetta sottomucosa radicale.

Ecchimosi ed edema postoperativo diminuiscono per mezzo di medicazione con nastro adesivo stretto sotto una forma e' rende capace al naso di la forma finale rapidamente.

Raccomanda fascia al mento per impedire il rimovimento degl' impianti al mento e pure in oltri operazioni plastici sul mento.

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To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the *Journal* to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the Seccion en Espanol, which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language.

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The Uses of Refrigeration in Surgery

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IT is about nine years since we began using low temperatures on the peripheral vascular diseases service at the New York City Hospital. Our problem was death. The patients with gangrene of the feet died if they were not operated upon and, with the methods we used at that time, four out of five died after operation. There were four surgical services, manned by complete teams on duty for three months and off for nine months. The department of anesthesia was well conducted; yet death was our problem.

The members of the medical services had no choice but to decide whether they preferred that their patients die without operation, or subject them to such highly unsuccessful surgery. At the City Hospital we had to accept every patient who came to us, either through the dispensary or transferred from other hospitals. We could not discharge a patient unless he had somewhere to go and someone to care for him. The patients had more than gangrene. They were old, under nourished, poorly clothed and generally neglected—and with multiple pathologic states. They were bad risks at best.

In 1940, we had a mortality, after amputations, of 55 per cent, which was low only because our medical friends dared to refer but 20 in the entire year. It had made no difference who operated or the type of anesthesia, most of these people died in spite of the fact that the surgical teams compared favorably with those of any other clinic.

A definite selection of risks was routine and the patients were completely prepared. Preoperative and post operative care was good.

After many years of painstaking research in his animal laboratory in New York, Dr. Frederick M. Allen published his experience with refrigeration anesthesia in 1937. Until we met in 1941, he had had very few of his patients operated upon, because he could induce but one surgeon to operate, even though Allen prepared the extremity. The technique he taught me remains the best I have heard or seen.

A series of 57 amputations was quickly completed with a mortality of less than 15 per cent, in a group of unselected patients. If we could convince ourselves that the gangrene of the foot was a definite contributing factor to the patients' serious condition, the part was removed, regardless of any other factors. Because shock is not possible with refrigeration, we were not as daring as we were considered.

A patient with a history of coronary heart disease, had an embolectomy which seemed successful for twenty-four hours. Then an embolus formed in the popliteal and further surgery was refused. Day after day she was advised to have an operation, even an amputation if necessary. After three days a definite line of demarcation appeared in the lower third of the thigh and, since the patient refused the treatment we suggested, the extremity was encased in ice bags from the mid-thigh to the tip of the toes. In a day, no further sedation was required and, as the weeks passed, the line of demarcation began to fade until six weeks later only the foot showed circulatory changes. She died of coronary disease. That was our first clinical experience with refrigeration as a preservative and making it possible for the development of new blood vessels. From then on our first effort was to save the part, not to remove it.

Cold has the unique property of simultaneously inhibiting pain, shock, exudation, infection and tissue devitalization. It thus serves for a number of medical and surgical uses. The main reason the list of users is not considerably larger is habit together with some misconceptions.

The physiological effects of cold vary widely, as pointed out by Allen,[1] not only according to the degree, time and other physical factors but also according as it may involve the whole body, local parts connected with the body, or local parts isolated from the body. While

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heat beyond a certain degree is absolutely destructive of all life, no such limits exist for cold. Some of the lowest forms of life, such as the bacteria, survive temperatures as near as possible to absolute zero, apparently for an indefinite time. Some vertebrates can withstand freezing for short periods. Still higher species, the hibernators, withstand temperatures only slightly above freezing for many months, during which time their heart action, respiration, and other vital functions are extremely reduced. The higher mammals and man are less resistant, but still a distinction must be made between the effects of actual temperature reduction and reactions which strive to prevent the reduction. A man exposed naked to severe cold dies within a few days from exhaustion due to shivering and other reactions which strive to maintain normal temperature. Temple Fay showed that when these reactions are inhibited by sedatives and the body cooled rapidly, temperatures below 80 F. can be tolerated safely for days.

Local parts of the body tolerate cold of a degree which would be fatal for the whole body. Thus limbs or ears can be frozen solid and survive if the time is not too long. Degree of temperature is a factor as well as time, so that freezing by solid carbon dioxide or liquid gases causes gangrene much more quickly than ordinary ice temperature. This is one danger to aviators in the extreme cold of high altitudes. Nevertheless it is not generally realized that freezing at these excessively low temperatures can be tolerated for one minute without harm to such delicate structures as the liver, the blood vessels and brain tissue.[2] Here also distinctions must be made. Limbs or other structures subjected to excessive degree or duration of freezing, even with solid carbon dioxide, do not become gangrenous from the cold but only secondarily from the thrombosis which results from the vascular damage. Practical therapeutic use is made of Lange's discovery[3] that prevention of thrombosis by heparin prevents necrosis and the frozen tissues survive. Even without heparin, it has long been known that rapid warming after frost bite or "trench foot" may precipitate gangrene in cases where the gradual warming may save the tissues. In the recent accident to Sumner Welles, our former assistant Secretary of State, the newspapers reported that not only was heparin used but also the exposed limbs were kept cool for several days.

When local parts are separated from the body, still other differences appear in the direction of a return to the resisting power of primitive protoplasm. Thus, human spermatozoa can survive temperatures near absolute zero for an hour or longer. Mouse cancer has grown after having been kept frozen for two years. The usual rule that the lowest temperature kills in the shortest time is often reversed, in the sense that the lowest temperature preserves for the longest time. For example, skin in its normal position sloughs after rather brief ordinary freezing and more quickly if frozen by solid carbon dioxide or liquid air, as already stated, but skin grafts are preserved for days or weeks by cold and are preserved better at the temperature of carbon dioxide ice than in an ordinary ice box.[4] It was also mentioned that the bloodvessels are normally most sensitive, so that their injury results in thrombosis which is the direct cause of gangrene; but blood-vessel segments are preserved for weeks or months at the temperature of solid carbon dioxide,[5] and then function successfully as grafts with no tendency to cause thrombosis. Radical chilling of any part of the body surface gives rise to various nervous and vascular reactions one of which is a red flush, shown by Lewis to be a local discharge of histamine-like substances. These reactions are absent not only in the amputated limb but also in a limb which is isolated by a tight tourniquet or by thrombosis of its main artery; and they are greatly diminished when the circulation is reduced by arteriosclerosis. The fears which have been promulgated by various writers concerning the clinical uses of refrigeration have been based upon total ignorance of these peculiarities of the action of cold under different conditions.

With this background we may summarize some of the therapeutic applications of cold as observed not merely by ourselves but especially by a large number of other workers.

Amputations.—The method of refrigeration anesthesia is doubtless now familiar, consisting of the stoppage of blood flow by a tourniquet and the application of ice or apparatus long enough for through and through chilling

of the part. This time may vary from 15 minutes for a finger to three or more hours for a thigh, since it depends upon the thickness of tissue to be penetrated by the cold. (A short man weighing 360 pounds had a tremendous thigh and required four hours to anesthetize.) The result is anesthesia because the cold nerves do not transmit impulses. Furthermore, there is a unique absence of shock because not only nervous but all protoplasmic functions are in abeyance. Therefore, this is the only method whereby a patient can eat a full meal immediately before a major operation and another one immediately afterward and behave in general as if there had been no operation. One of my guests at the Clinic visited a man he had seen operated, after the patient had been returned to the ward. The doctor asked if the patient had much pain or discomfort at the time of the operation. In a disappointed tone, the patient wanted to know how he could have had pain when all they did was to keep him in the operating room for a half hour, then send him back to the ward without operating upon him. These advantages are generally accepted in poor risk patients. In other cases, most surgeons still use methods which appear more habitual or convenient. The refrigeration method can be made convenient when the operator and his staff are accustomed to it, and especially if ice can be replaced by the electric unit which is thermostatically controlled. One surgeon told me the anesthesia was perfect but he would not use it again because his resident refused to get up at three o'clock in the morning to encase the patient in ice. The surgeon was informed that all the resident has to do is properly apply the tourniquet by getting up about fifteen minutes earlier than his usual arising time. The preparation of the tourniquet site and after the tourniquet is in place, the complete encasement of the extremity in ice are duties of the ward nurse. We have always opposed the surgeon's convenience as a reason for inflicting shock on any patient who is regarded as strong enough not to die from it. A doctor who is very well known all over the world refused to try refrigeration anesthesia because of his complete satisfaction with a saddle type spinal. When reminded that even he had had patients die as a result of spinal anesthesia, he agreed but said that is to be expected. No patient can die as a result of the low temperature anesthesia.

Other Operations on the Extremities.—Refrigeration has special advantages for orthopedic and reconstructive operations, in the preservation of tissue vitality and control of post operative pain and edema. The practical benefits were demonstrated statistically by Schaubel.[6] The effects of cold being not injury but preservation, it remains only to discuss the tourniquet. The convenience of absence of blood flow is recognized. Possible tourniquet injuries must be recognized, though they are reduced in proportion to the temperature.

We have never encountered trouble from vascular damage or thrombosis, even in advanced arteriosclerosis. On the contrary, thrombotic accidents are greatly reduced by the better tissue preservation and the direct inhibition of clotting. In our work we have, on occasion, been embarrassed by taking a longer time to control an ooze when closing the wound than for the operation itself. We never have seen a blood clot. Nerve damage is less important in amputations than in other operations and though it is reduced by cold, paralysis can occur from prolonged tourniquet constriction, particularly in the arm where nerves may be crushed directly against bone. The procedure is a matter of choice and conditions. When circulation is greatly reduced by arteriosclerosis, effective chilling is possible without a tourniquet, merely by lengthening the time of refrigeration. This plan is used occasionally even for amputations.[7]

Dr. James Lisa, our pathologist at the Hospital, examined every extremity removed and in addition to the usual complete specimen autopsy he was asked to determine whether there was gross and/or microscopic evidence of structural changes due to the prolonged periods of chilling; or, did the pressure of the tourniquet damage the tissues from the skin down to and including the bone, especially the blood vessels which are almost normal and the ones in an extreme degree of sclerosis? Inasmuch as the tourniquet may be placed 12 to 18 inches proximal to the line of incision, there had been no opportunity to examine the exact area of pressure. With this in mind, a 74-year-old patient who was scheduled for a supracondylar amputation, had a tourniquet applied

two inches below the site of the proposed skin incision, and left for twenty-seven hours with the extremity refrigerated. After the first tourniquet had been in place for twenty-four hours, the entire extremity was prepared for the operation by placing a second tourniquet around the upper third of the thigh. Following amputation, the specimen with the first tourniquet still in place, was sent to the laboratory. If our type of tourniquet, which is a one-half inch rubber tubing, is properly applied with the refrigeration continuous, there will be no pressure changes. Dr. Lisa examined the tissues proximal to, then at the pressure site and, finally, distal to the tourniquet. He reported there were no changes from either the low temperature nor from compression, after twenty-seven hours' application.

Legs with normal circulation can be chilled as high as the knee without a tourniquet. Breaking up adhesions about the ankle and the knee and other orthopedic procedures have been performed advantageously.[8] A thigh of ordinary thickness and circulation cannot be anesthetized satisfactorily without the use of a tourniquet. Gratz has shown, however, that anesthesia without prolonged tourniquet pressure can be obtained by continuous refrigeration and intermittent tourniquet applications. The tourniquet is left in place for any desired time, from fifteen minutes to an hour, then removed to allow circulation for a short time and replaced, perhaps at a different point. If disability were to result from the narrow tourniquet, it would be transitory. Never are there permanent paralyses or contractures such as may complicate the use of broad constrictions.

This fact was illustrated in the case of a man aged 55 years, with a four plus Wassermann and rather poor general condition. For special reasons, not connected with anesthesia, tourniquet constriction was used for an exceptionally long time without chilling. It was a cold day in December, the ward temperature was 72 and under the bed cloths it was 89 degrees F. No refrigeration was used. The tourniquet was applied and held in place for seven hours and ten minutes at this temperature. Distal to the tourniquet, the skin was blanched and there was no edema. When the constriction was released, the foot and leg swelled to twice the normal size. There was severe inflammation but no necrosis. Motor and sensory paralysis gradually cleared up during several months. This case is recited to impress the fact that damage resulting from a properly applied narrow tubing, at room temperature, is not a permanent paralysis.

An especially made narrow, air tourniquet is not as painful as the tubing. Experiments among the members of the staff were interesting. After the oscillometer cuff had been applied immediately above the ankle and the graph recorded, no one of us could stand to have the tubing tight enough to cut off the oscillations when the tourniquet was placed immediately above the knee. With the narrow air cuff, the oscillations were cut off when the gauge showed 6 pounds, and each of us could endure the pressure until the gauge showed thirteen pounds.

It should not be long before enough is known about tourniquets to remove the dread which now exists among the inexperienced.

Fractures.—While refrigeration can be used it is neither necessary nor convenient for ordinary fractures. It has value in exceptional cases of multiple fractures with considerable shock, or when tissue vitality is endangered by mangling of tissues, by thromboses, or when operations must be delayed, as when injuries are sustained at a distance from a hospital.

Delayed Operation.—Classic examples are the following: 1. McElvenney's case[9] of amputation of both legs by a railroad train; packing in ice to control pain, infection and tissue devitalization for fifty-eight hours, until shock could be overcome sufficiently for successful surgical amputation. 2. Mock's cases[10] of crushed pelvis with thrombosis of iliac or femoral arteries, presenting the dilemma of shock-death with immediate amputation, or gangrene-death with delay. The extremities were preserved in ice for two and one-half weeks of general convalescence, and final amputation above the knee, instead of near the hip. 3. Ottaway and Foote's case[11] of a seaman on a destroyer whose femoral artery and vein were severed 6 cm. below Poupart's liga- for almost a month until the patient could be ment by a shell fragment: painless preservation transferred for successful amputation above the knee, thus adding a further example of the development of collateral circulation in

refrigerated tissues. 4. The cases of Nachlas[12] in which blast injuries were so severe that the only immediate treatment for mangled hands would have been amputation. Ice preservation of the hands during two weeks of constitutional recuperation permitted successful reconstruction.

In many conditions, the use of refrigeration is optional. It should be noted that in cases such as those here illustrated, there is no choice, because there is no means for saving life or limb except by the use of low temperatures.

Limb Infections.—Fulminant limb infections which threaten life can sometimes be controlled by refrigeration. Ferguson[13] reported benefit in the treatment of gas gangrene. When an extremity is to be sacrificed, a tourniquet can amount to a shockless emergency operation (amputation) but it should be omitted if there is hope of saving the part. The purpose of refrigeration may be conceived as two fold. First, it clears up the odor and dark color of tissues and exudates, and the appearance of increased oxygenation suggests a better defense against anaerobes in addition to the general inhibition of bacteria by cold. Second, the retarded formation and absorption of toxins gains time for drug and serum treatments to become effective, and the anesthesia prepares for surgical drainage or amputation.

Hemorrhage.—Severe hemorrhage can sometimes be stopped only by a tourniquet, especially under emergency conditions. Interrupted tourniquet applications, as recommended in first aid instructions, are by no means harmless. It is often possible to reduce the temperature with ice or cold water. And emphasis should be placed upon the basic principle that injury will be lessened in proportion as the temperature is lowered. It may thus be possible to leave a suitable tourniquet in place for a number of hours, or at least to reduce the number of changes and minimize inflammation and any devitalization. The free blood flow seen when a tourniquet is removed from a refrigerated extremity, and the previously mentioned development of collateral circulation during prolonged refrigeration serve to dissipate fears of vasoconstriction from cold. On the contrary, there are theoretical grounds for hoping that the contraction of collateral branches following the wound of an artery may be released by cold even better than by procaine.

Thrombosis and Embolism.—Since the clotting of blood is an enzymatic process, the above mentioned inhibition by cold is obvious. Equally important is the evidence of preservation of vitality in the vessel wall and the surrounding tissues. When the main artery of an extremity is occluded, completely, the result is the same as in traumatic cases mentioned under "delayed operations." We have had several experiences of preservation of limbs for several weeks after embolism; however, the final result must be amputation, and the only advantage is the delay of operation when necessary, for example, in a severe cardiac case. The greatest theoretical usefulness of refrigeration for embolism has never yet received practical trial. The principle already proposed[14] is that as soon as complete occlusion of a main artery is diagnosed, either in a hospital or in the home, the extremity should be immediately refrigerated, and preferably, a tourniquet should be placed proximally to the site of the embolus.

The general purpose of refrigeration is to control pain, shock and devitalization of vascular endothelium and general tissues, and to arrest further clotting and adherence of clot to the vessel wall. The tourniquet sets an absolute limit to upward propagation of the thrombus. It stops inadequate collateral circulation and facilitates the necessary deep chilling. The limb is thus ready for operation without other anesthesia. The hope is that this plan will extend the time and improve the results of embolectomy. Restoration of circulation may be successful after intervals measured in days rather than in hours as at present. Trials of the plan may be valuable and at most should be harmless.

Information of this nature should be given the general practitioner for it is he who sees the patient first. Too often the doctor waits for the development of additional symptoms so that by the time the correct diagnosis is made and a consultant summoned, too many hours have elapsed for a successful embolectomy. The diagnosis of embolism usually is not difficult if this condition is borne in mind. The history of a very acute onset with an excruciating and

persistent type of pain should be sufficient to make the doctor appreciate that an urgent emergency is at hand. If the extremity could be packed in ice while the diagnosis is in the making and the refrigeration continued until the patient reaches the operating room, his chances for success will be enhanced. An acute, excruciating, persistent pain should make the diagnosis. If the diagnosis of embolism proves to be incorrect, the treatment with low temperatures will do no harm. If the physician will consider every acute, excruciating, persistent pain as an embolism, he will be right more often than he will be in error.

Shock.—The inhibition of shock by cold is practically complete in the sense of prevention, that is, when the tissues are chilled before the trauma is inflicted. The protection is in proportion to the degree of cold—short of freezing. The optimum temperature is probably 10 C. or 40 F. and at this temperature tissues are practically as unreactive as dead tissues, so that any number of operations can be performed with no shock other than that of the wound remaining after normal temperature is restored. The therapeutic effect, when cold is applied after the injury, is far less although still definite. Thus refrigeration was a standard feature of the treatment of crush injuries during the war-time bombing of England. The main fact is that the immemorial tradition of warmth for shock has been overthrown since Allen's original experiments[15] have been confirmed by all subsequent investigators. For generalized shock a reduction of body temperature by two to four degrees seems advisable. The benefit of radical chilling of accessible local wounds, as in the limbs, is fully established. This treatment may be combined with local compression, which originated in England during the war. The disadvantage or danger of compressive dressings is the harm to poorly nourished tissues and the incubation of bacteria. Cold counteracts these dangers besides adding its own benefits.

Frostbite and Burns.—Other authors have confirmed the experience of Webster, Woolhouse and Johnston[16] that prolonged applications of moderately reduced temperature relieves pain, circulatory and nervous disturbances and lessens the need for amputation in cases of exposure, frostbite and "trenchfoot."

Burns preeminently demand the unique property of cold for simultaneously controlling pain, shock, exudation, infection and tissue devitalization. After our small preliminary experience[17] in New York City Hospital, the most striking case was that of Kross[18] which involved saving the life and limb of a woman who was moribund after a neglected infected burn from the mid-thigh to the tips of the toes. The patient was referred to the Hospital for an immediate high thigh amputation. She was septic. Dr. Kross decided that if low temperature was of any value in burns, it should be demonstrated here. He ordered that the patient was to receive no narcotic, sedative, aspirin or antibiotics. She might have mineral oil and/or castor oil by mouth for constipation, and nothing else. No debridement was permitted except the irrigation of the parts with chilled saline which mechanically washed out the already separated dead tissue. The burned areas were covered by a loosely applied plain vaseline gauze, single thickness and the blanket attached to the electric unit encased the vaseline gauze-covered extremity. The technique is the same when ice bags or cracked ice is used. Because we were so handicapped with less than half of the usually required personnel, this case could not have been treated with the ice method. Treatment was necessary for the longest period of refrigeration reported, namely, eleven weeks. When a limb is to be sacrificed, as in cases here reported, the lowest continuous temperature gives the best preservation; but when the limb is to be saved, healing is facilitated by the highest temperatures that are safe. Thus, in the Kross case, radical refrigeration near ice temperature was maintained during the first few days to check infection and intoxication, after which the skin temperature was kept between 60 F. and 70 F. most of the time, because a higher temperature brought a return of pain and fever, and a lower temperature would have needlessly retarded healing.

The best effect of cold treatment is obtained by the most thorough chilling with ice or cold water as soon as possible after the burn. Not only are pain and other immediate symptoms relieved, but the subsequent inflammation and necrosis are greatly diminished. Every time the burned area is dressed, the single thick-

ness of vaseline gauze is painlessly removed, and with it comes the separated tissues. Irrigation with chilled saline more thoroughly cleanses the part. Bacteria cannot grow at this temperature. Since burns are superficial, the treatment is feasible for all parts of the body, not merely for the extremities. In the treatment of extensive burns, ice involves considerable labor, pressure, uncertain temperatures and other disadvantages. When prolonged treatments are required, the electric unit‡ gives the best results, with applicators adapted to the various regions and needs.

Miscellaneous Uses.—The delay of absorption by cold is illustrated by Yudin's report[19] that rabbits are saved from lethal quantities of mustard gas by chilling the site of application. This principle, together with the relief of pain, recommends the method for treating bites and stings of insects, spiders, scorpions and snakes. The prevalent use of a tight tourniquet for snake bite is a harmful fallacy, except in cases dangerous enough to require saving the life by a subsequent amputation of the extremity.[20] Cold can reduce both tissue damage and absorption, besides providing anesthesia for the pain and facilitating the usual incisions and drainage. It should therefore be a standard essential of the treatment.

One of our earliest experiences, namely the dramatic results with gangrenous and infected extremities, illustrated this same principle. A patient with a decomposing leg, high fever, collapse or unconsciousness becomes transformed within twenty-four or forty-eight hours after the packing of the part in ice, with or without a tourniquet. The formerly hopeless operative risk becomes hopeful.

The chilling of the entire lower half of the body has proved feasible in animals, with the aid of an abdominal tourniquet. The use of such a tourniquet, together with refrigeration, for uncontrolled post partum hemorrhage may therefore not be as formidable as it appears, and is evidently justified in cases otherwise hopeless.[21]

The preservative power of cold receives its severest test in cases of complete or nearly complete separation of parts from the body. The exceptional rules of temperature reduction for such isolated parts were mentioned at the outset, but if these parts are large or highly organized they cannot be preserved with the same impunity as simple grafts. The smallest part to be considered under the present topic is a finger which has been accidentally severed so that it hangs by only a tiny shred of skin. I had two such cases[22] and Kanaar another.[23] One of my patients was a 65-year-old laborer, who had his right thumb cut off at the interphalangeal joint. The plant doctor telephoned me and because I could not see the patient for more than three hours, he asked if I wished him to amputate proximal to the head of the proximal phalanx, as at that site he could cover the stump with skin. He was sure the distal fragment could not be saved. The doctor was advised to place the entire hand in a basin of snow-ice together with the part which was held by a thread of skin and instruct one of his nurses to keep it covered with ice at all times. It was four hours before I saw this man. The doctor was amazed that the parts remained fresh. During this interval, the patient was none the worse for the delay. The surgery was nothing more than what most doctors have performed in their offices; attempting as good an apposition and alignment as possible with no thought of blood vessel repair. The trauma had roughened the joint surfaces. Following the operation, chilling was continued by means of three ice bags. The palm of the hand rested on one and the others covered the back of the hand, wrist and lower forearm; twenty-four hours postoperative, the ice bag over the lower forearm was removed. The next day, the one on the back of the hand was taken off, and on the third day the use of the ice bag was discontinued and a small electric fan played on the part for twenty-four hours. The part healed kindly and the patient returned to his regular heavy work, the only kind of work he knew. Ankylosis at the interphalangeal joint proved to be no real handicap. This case illustrates just one thing: if the parts are kept cold, there is no great urgency. Too many "parts" have been thrown in the waste pail. This is an illustration not only of the preservation of tissue vitality with minimum nutrition, but also the healing and formation of blood vessels at reduced temperatures.

‡Manufactured by the Therm-O-Rite Products Company, Buffalo, N. Y.

It will doubtless be considered a wildly imaginative suggestion that a human arm or leg, amputated in some accident might be kept on ice for a day or two and then restored to position and function. The idea already is past the imaginary stage. The method of blood vessel grafts devised by Blakemore and collaborators[5] finds its first clinical application in injuries involving loss of circulation in an extremity, often with considerable deficits in the vessels, though the part remains attached by bone or other structures. The repair of the blood vessels is the only requisite for saving such a part, and has been proved feasible.

Since refrigerated legs of animals have survived total anemia for fifty-four hours without thrombosis or loss of function,[24] and rats' tails have similarly survived for ninety-six hours,[25] the possibility of postponement of these repair operations for at least a few days is evident. Especially is this true in view of the longer periods described under "delayed operations." The extreme step was taken by the Blakemore group when they amputated dogs' legs, stored them in the ice box for twenty-four hours, and then successfully united them to the body. The technique is far more difficult in dogs than in man so that, although this operation has not yet been performed in a human case, there is no reason why trials should not be made, even if the severed extremity must be refrigerated for one to several days before arrival at a suitably equipped hospital. For the best results, the operator must be more than a very good general surgeon; he must also be a clever blood vessel surgeon.

What has been accomplished by refrigeration for anesthesia and for the preservation of traumatized tissues will, I think, be proved by time to be little compared with the possibilities to be in process of development. Refrigeration cannot convert dead tissues into healthy structures but it does prevent the decomposition when almost all of the blood supply has been cut off. According to the definition of death, all the skin, blood vessels and yes, the blood stored in the ice box, are "dead," yet they accomplish wonders when properly used in healthy tissues.

Refrigeration never cures—it supports. No splint ever healed a fracture. No surgeon ever cured a patient. The surgeon may be likened to a good football coach who studies ways and means of getting rid of the opponents' interference. If the surgeon can rid the patient of the condition which is interfering with good health, the patient then "carries the ball."

Do not expect the impossible with any modality. Richards of California reported an embolectomy which he said was poorly done. The pulsation was not recovered. Three days after the establishment of a line of demarcation, refrigeration was instituted and continued for three days before amputation. Because the pathologist found the tissues decomposed, Dr. Richards decided that refrigeration was useless. It had not prevented the death of the tissues. The line of demarcation was positive proof that the blood supply to the part had been cut off. During the next three days, at room temperatures, the tissues sloughed, so that before the application of low temperatures, the leg had spoiled. If one places a rotten egg in the deep freeze, what he takes out at a later date will be a rotten egg.

Begin the use of refrigeration before viability has been lost.

SUMMARY

A series of conditions is described in which refrigeration of local tissues is valuable by reason of its unique power to control simultaneously pain, shock, exudation, infection, and tissue devitalization. There is also occasional use for retarding toxic absorption, thereby gaining time for other treatments. These uses are sometimes optional, sometimes give improved results and sometimes are the one indispensable means of saving life and extremity. For new applications, emphasis is placed on its value in the treatment of burns and for certain new developments in surgery.

RÉSUMÉ

L'auteur décrit une serie de conditions dans lesque les la réfrigération locale des tissus est de valeur, vu son pouvoir unique de contrôler simultanément la douleur, le choc, l'exudation, l'infection et la dévitalisation des tissus. Il y a aussi son emploi occasionnel pour retarder l'absorption toxique, ainsi gagnant du temps pour d'autres traitements. Ces emplois sont parfois facultatifs et parfois indispensables pour sauver la vie et l'extremité. Pour de nou-

velles applications, l'auteur place de l'emphase sur la valeur de cette méthode dans le traitement des brulures et pour certains nouveaux développements de la chirurgie.

ZUSAMMENFASSUNG

Es wird eine Reihe von Zustaenden beschrieben, in denen oertliche Gewebsabkuehlung auf Grund ihrer einzigartigen Faehigkeit, Schmerz, Shock, Exudation, Infektion und Gewebstod einzuschraenken, von Wert ist. Die Massnahme laesst sich auch gelegentlich anwenden, um die Absorption von Giftstoffen zu verzoegern und damit Zeit fuer weitere Behandlung zu gewinnen. Waehrend die Anwendung der Methode in manchen Faellen Sache der freien Wahl ist, stellt sie in anderen ein unentbehrliches Mittel zur Erhaltung des Lebens oder eines Gliedes dar. Was neuere Anwendungsformen betrifft, so wird der Wert des Verfahrens in der Behandlung von Brandwunden und in gewissen neu entwickelten Gebieten der Chirurgie hervorgehoben.

RIASSUNTO

L'A. descrive una serie di condizioni nelle quali la refrigerazione locale e' particolarmente utile per combattere nello stesso tempo dolore, shock, essudazione, infezione e devitalizzazione dei tessuti. La refrigerazione puo' essere anche adottata per ritardare l'assorbimento di tossine, dando con cio' maggior tempo per altri metodi di cura. Alcune indicazioni cliniche sono facoltative, altre indispensabili per la salvezza degli arti e per la vita stessa dei pazienti. L'A. sottolinea infine l'opportunita' di estendere l'uso della refrigerazione alla cufa delle ustioni, nonchè a taluni nuovi metodi chirurgici.

RESUMEN

Se describe una serie de estados en que es de importancia la refrigeración tisular local, en virtud de su extraordinario poder para controlar simultáneamente dolor, choque, exudación, infección y desvitalización tisular. Asimismo le uso ocasional para retardar la absorción tóxica, ganándose por consiguiente tiempo para otros tratamientos. Estos usos son algunas veces opcionales, algunas veces el solo medio indispensable para salvar vida y extremidad. Se señala su valor en el tratamiento de las quemaduras y ciertas manifestaciones quirúrgicas recientes.

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Case Report

Operative Excision of Giant Panniculus Adiposus

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MADISON, WISCONSIN

OPERATIONS for removal of excessive subcutaneous abdominal fat are described in most textbooks on plastic surgery. Such operations, as commonly practiced, are used to remove transverse rolls of adipose tissue, largely for cosmetic purposes.

The case to be presented here, however, is considered worthy of being recorded in the surgical literature because of the unusual extent and nature of the obesity, as well as the technical difficulties of the operative procedure.

Improvement in the patient's appearance was of secondary importance in the decision to operate. The risk of such an extensive procedure was accepted chiefly because of the degree of incapacity in an otherwise healthy, vigorous man.

Search of the literature has revealed only one other giant panniculus of comparable extent which was removed surgically. In 1939 Dr. Linton Smith of Atlanta, Georgia, reported a case in which a huge abdominal apron was removed successfully.

REPORT OF CASE

Mr. A. B., a 45-year-old welder, was referred to the Jackson Clinic on Sept. 6, 1949, by his family physician, Dr. C. M. Frye of Rock Falls, Illinois.

The patient's chief complaint was of extreme obesity, in particular of a large apron of fat that hung down from his abdomen. Six years before admission he suffered a compound leg facture and was confined to bed for a number of months. During this time he gained weight very rapidly and reached a maximum of 700 pounds (350 Kg.). After recovery from his fracture he returned to work and was put on a strict reduction diet. Under this regimen his weight came down considerably and was stabilized at about 450 pounds (225 Kg.), which was his weight when he entered the Clinic. Although he had been working regularly at his job in the foundry, he had great difficulty in moving about. Several members of his family were extremely heavy and had a tendency to abnormal obesity, but none of them had ever shown a true giant panniculus adiposus.

Physical examination gave essentially negative results except for the unusual obesity. The heart and lungs were normal; the blood pressure in millimeters of mercury was 210 systolic and 150 diastolic. The obesity was of peculiar distribution. The

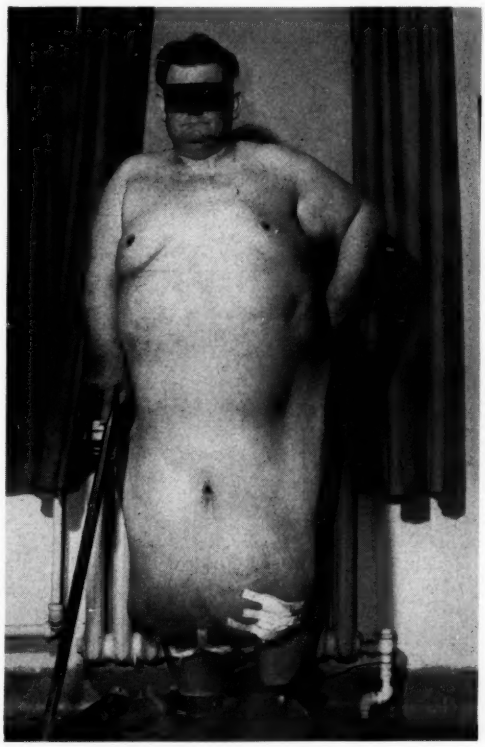

Fig. 1.—Mr. A. B., aged 45. Giant panniculus adiposus, front view.

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Submitted for publication Nov. 10, 1950.

Fig. 2.—Same patient. Giant panniculus adiposus, lateral view.

face, neck, buttocks and extremities were not unusually heavy. The extreme adiposity was confined to the abdomen in the form of a huge fatty apron, measuring 3½ feet (106.7 cm.) across the base and 1½ feet (45.7 cm.) across the distal end and hanging to within a few inches of the ankles. The genitalia and the knees were completely hidden, and the umbilicus was displaced downward to the level of the midthigh. The skin of the lower third of the fatty apron was markedly edematous and cyanotic, and there were several small areas of superficial ulceration due to burns resulting from his occupation as a welder. The skin within the deep folds of the groin was excoriated and covered with rancid sebaceous material. The genitalia were normal in appearance.

Routine blood and urine examinations revealed no abnormality. Serologic studies were also noncontributory. The serum cholesterol was within normal limits, as was the urinary excretion of 17 ketosteroid. The fasting blood sugar level was 114 mg. per hundred cubic centimeters. The value for total serum protein was 6.8 Gm. with a slight increase in the globulin fraction. Routine roentgen examination of the chest showed a normal cardiac silhouette and normal lung fields. The electrocardiogram was normal. Singularly, the patient's basal metabolic rate was plus 41; this could have been accounted for by the fact that he had taken 2 grains of thyroid daily for two weeks before this test. There were no symptoms or signs of endocrine disturbance.

After considerable study, radical excision of the massive panniculus was thought to be feasible, and a date was set for operation. We knew that one of our greatest dangers would be that of infection in the operative wound. Consequently, the entire operative field was washed daily with G-11 soap and kept covered with sterile drapes for a week beforehand. The condition of the skin improved markedly. A full daily dose of penicillin was also given during preoperative and postoperative treatment.

Operation was performed on September 27. Since the regular operating table was much too narrow for the patient's bulk, he was placed on a standard hospital bed with a hard mattress, the bed being equipped with a Balkan frame. Satisfactory spinal anesthesia was obtained by the use of 15 mg. of nupercaine. In order to obtain physical control over the heavy panniculus, it was suspended from the Balkan frame. Two heavy steel pins were transfixed through the distal end of the apron, and the huge mass was elevated by a rope and pulley system. It could thus be raised, lowered or shifted with ease. This we considered one of the cardinal features that enabled us to carry out the extensive operation with facility. Instead of the ordinary small surgical scalpel, two large regular skinning knives were purchased and used.

The entire fatty apron was excised at its base by means of a transverse elliptic incision extending from flank to flank. Except for a small umbilical hernia, the musculature of the abdominal wall was intact. Numerous large veins were encountered, but there was little loss of blood, since elevation of the apron had drained the vascular bed. The umbilical hernia was repaired in the usual manner. The edges of the wound in the abdominal wall fell together without tension, and the incision was closed with multiple rows of chromic catgut sutures. The mass after removal and drainage of blood and serum weighed 53 pounds (26.5 Kg.), undoubtedly considerably less than *in vivo*.

Except for a temporary drop in blood pressure following induction of spinal anesthesia, the operation was well tolerated by the patient. He was supported by ephedrine, oxygen and 1,000 cc. of whole blood.

About four hours after the operation the patient again showed signs of shock and was given another transfusion, as well as several 2 cc. injections of lipoadrenal extract. The cause of this episode of collapse became apparent several days later, when it was discovered that the right half of the wound contained a hematoma with an estimated volume of 1,000 to 1,500 cc. of blood. In order to evacuate it, we found it necessary to open the right half of the incision. The left half of the wound healed by primary intention, but the other side became superficially infected with Bacillus pyocyaneus. The infection was treated with systemic streptomycin and local compresses of 0.5 per cent acetic acid. Healthy granulations quickly covered the surface of the defect, and the wound was allowed to fill in from the bottom. This progressed with remarkable speed and was 95 per cent healed within six weeks.

About two months after the operation the patient was able to go back to his regular work. He is now able to move around with considerably more freedom; he feels better, and is happy to be able to wear a regular suit of clothes instead of the outsized overalls which were his only clothing before the operation.

In spite of a strict 1,000-calory diet the patient has been unable to reduce beyond the 350 pounds (175 Kg.) he weighed when he left the hospital.

SUMMARY AND CONCLUSIONS

1. Modern preoperative preparation and therapy enabled the authors to remove a giant panniculus from a patient without undue danger or difficulty.

2. A possibly disastrous fulminating infection may be avoided by careful preoperative preparation of the skin and daily adequate administration of penicillin for at least a week before operation.

3. Elevation of the panniculus with a rope and pulley swung from a Balkan frame greatly facilitated surgical removal of the apron.

4. More careful hemostasis during the operation could have prevented the huge hematoma which delayed healing and closure of the wound.

RÉSUMÉ

1. La methode préoperatoire moderne et la thérapie permirent aux auteurs de faire l'ablation d'un pannicule géant chez unmalade, sans danger et sans difficultes.

2. Une infection fulminante désastreuse possible peut être évitee par la préparation préoperatoire soignée de la peau du malade et par l'administration adéquate quotidienne de penicilline pour environ une semaine avant l'opération.

3. L'élévation du pannicule à l'aide de corde et de poulie facilitat beaucoup l'ablation chirurgicale.

4. Une hémostase plus soignée au cours de l'opération aurait empêché un hématome volumineux qui retardat la guérison et la fermeture de la plaie.

RESUMEN Y CONCLUSIONES

1. La preparación preoperatoria y terapéutica modernas facilitaron a los autores la extirpación de un gran panículo sin peligro o dificultad.

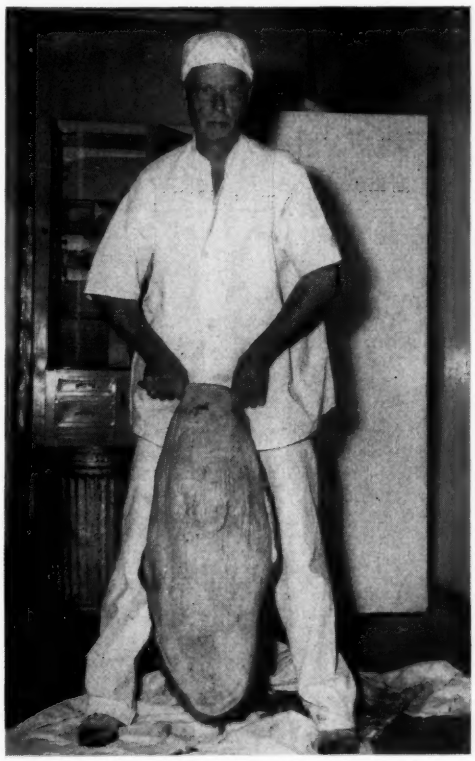

Fig. 3.—Giant panniculus adiposus after surgical removal. The mass weighed 53 pounds (26.5 Kg.).

2. Puede evitarse una infección fulminante, posiblemente desastrosa, por la cuidadosa preparación preoperatoria de la piel y la administración adecuada de penicilina, diariamente y cuando menos por una semana antes de la operación.

3. La elevación del panículo con cuerda y polea movidas en un cuadro Balcán facilitan grandemente su extirpación quirúrgica.

4. La hemostasia peroperatoria muy cuidadosa puede prevenir el gran hematoma que retarda la cicatrización y cierre de la herida.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die Anwendung moderner praeoperativer Vorbereitungs- und Behandlungsmethoden hat es den Verfassern ermoeglicht, das riesige Fettpolster eines Kranken ohne ungebuehrliche Gefahr oder Schwierigkeiten zu entfernen.

2. Die Moeglichkeit einer heftigen katastrophalen Infektion kann durch sorgfaeltige praeoperative Vorbereitung der Haut und durch die Verabfolgung angemessener taeglicher Dosen von Penizillin mindestens eine Woche lang vor der Operation vermieden werden.

3. Das Hochheben des Fettpolsters mit Hilfe eines Seiles und eines ueber einen Bettrahmen geschwungenen Zuges trug erheblich zur Erleichterung der Resektion bei.

4. Ein grosser Bluterguss, der die Heilung und die Schliessung der Wunde verzoegerte, haette durch eine sorgfaeltigere Blutstillung waehrend der Operation verhuetet werden koennen.

RIASSUNTO

1. Preparazione e terapia moderna preoperativo permettano gl'autori di sollevare d'un paziente un panniculo gigantesco senza pericolo o difficoltà.

2. Infezione fulminante e disastroso si evita per mezzo di preparazione vigilante pre operativo della pelle, e l'amministrazione giornalmente di Penicillin sufficiente per almeno una settimana in anticipo della chirurgia.

3. Elevazione del panniculo a fune e carrucola sospeso dell 'armature Balkan facilità l'eccizione.

4. Piu attento al emostasi durante l'operazione per prevenire l'ematoma immenso che ritardo' la guarigione e chisura della ferita.

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If a man feels that his life is wonderful, and if he is reflective withal, he wishes to make a record in order more fully to realize and preserve it. So Pepys overflowed with wonder and delight that he should be a part of these great events, "himself not least but honored of them all." And no doubt he loved to reread it. "A man," said Doctor Johnson, "loves to review his own mind."—*Charles Horton Cooley*

New Anatomic Rings

PEDRO D. CURUTCHET, M.D., F.I.C.S.*
BUENOS AIRES

FIG. 1 represents a Hegar-Mayo surgical needle holder with Dr. Pedro D. Curutchet's anatomic rings. The broad and beveled anatomic rings, constructed according to digital anatomic specifications, are comfortable and do not tire the fingers. The contact surface, tactile and kinestatic, is three times as large as the ordinary one (Fig. 2). All this makes the pressure comfortable, secure and precise for the benefit of suturing. The broad and beveled anatomic rings allow one to take the instrument and to put it aside with the greatest ease. This model was constructed for my own left hand.

It is for the benefit of surgical technic that I wish to publicize *the principle of anatomic rings* for all such instruments as hemostatic forceps, intestinal forceps, shears, clamps, etc. This modification will neither complicate the instrument nor make its production more expensive. It will not increase either the volume or the weight of the instrument. It has no influence on the length, and does not alter the shape. It is an easy but effective modification.

Although surgeons have hitherto been mainly interested in the basic mechanics of each instrument and its specific application, the principle of these anatomic rings is a general one and is aimed toward improvement of current operative technics. The rings represent a correction of the unacceptable rings of the usual forceps and shears, which make movements tiresome and difficult and impede their precision. It was not intended to create a specific and personal instrument but to offer an improvement and to eliminate a great inconvenience. I have found that, wherever explained, it attracts the immediate interest of every surgeon.

*Titular member for the Argentine Chapter, International College of Surgeons.
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INSTRUMENTS AUX ANNEAUX ANATOMIQUES

La Fig. 1 réprésente un porte-aiguilles de Hegar-Mayo avec des anneaux anatomiques

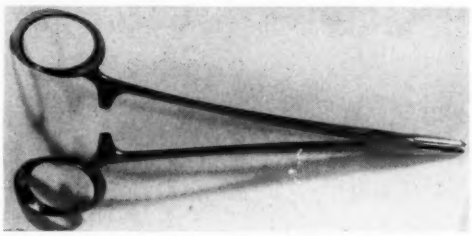

Fig. 1.—Needle-holder with author's anatomic rings.

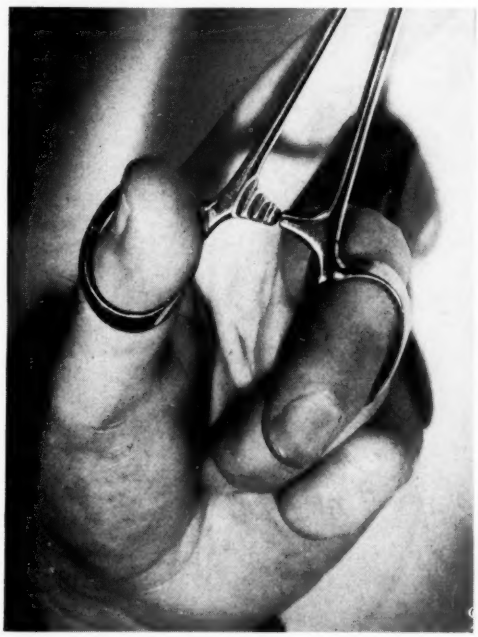

Fig. 2.—Anatomic adaptation and the surface contact with surgeon's fingers are improvements over usual rings.

du Docteur Pedro D. Curutchet. Ces anneaux anatomiques, larges et biseautés suivant les exigences d'anatomie digitale, ne gênent pas et ne fatiguent pas les doigts. La surface en contact, tactile et kinéstétique est trois fois plus grande que celle d'un anneau commun (Fig. 2). Et c'est pour celà qu'elle nous donne une *pression commode, sure et précise* au profit de la suture.

Ces anneaux, larges et biseautés nous permettent de prendre et de remettre les instruments avec la plus grande facilité. Ce modeleci est pour la main gauche de l'auteur. C'est au profit de la téchnique d'opérer que *l'auteur propose de généraliser le principe des anneaux anatomiques* et de l'adapter a tous les instruments comme pinces hémostatiques, pinces intestinales, ciseaux, clambs, etc. Cette modification ne fait pas la production plus chère et ne la complique pas. Elle n'augmente ni le volume ni le prix d'instrument et ne change pas sa longueur et sa forme. C'est une modification simple et efficace. Jusqu'à présent la chirurgie ne s'intéressait qu'à l'usage mécanique et immédiat de chaque instrument dans son application spécifique. Le principe des anneaux anatomiques n'est pas spécifique et son but est d'améliorer la téchnique présente. Plus qu'une invention les anneaux anatomiques constituent une correction des anneaux inacceptables de nos pinces et siceaux que fatiguent et gênent les doigts et rendent l'exécution et la précision des mouvements plus difficiles. Grâce a son usage géneral et son élimination d'un important inconvénient ces anneaux sont de grand intérêt pour les chirurgiens.

INSTRUMENTOS DE ANILLOS ANATÓMICOS

La Fig. 1, muestra un porta-agujas de Hegar-Mayo con los anillos anatómicos del Dr. Pedro D. Curutchet.

Los anillos anatómicos, anchos y biselados, de acuerdo a la anatomía digital, no molestan ni fatigan los dedos; la superficie de contacto, tactil y kinestésica, es tres veces mayor que la del anillo común (Fig. 2). Por todo ello, *proporciona una prension cómoda, segura y precisa*, en favor de la sutura. Los anillos anchos y biselados permiten tomar y dejar el instrumento con facilidad.

El presente modelo es para la mano izquierda del autor.

En positivo beneficio de la técnica operatoria, *el autor propone generalizar el principio de los anillos anatómicos* a todos los instrumentos similares: pinzas hemostáticas, pinzas intestinales, tijeras, clambs, etc. Esta modificación no complicaría ni encareceria la fabricación. Tampoco aumenta el volumen ni el peso de los instrumentos, ni modifica la longitud ni la forma de las ramas de dichos instrumentos.

Es una modificación simple y eficaz, sinembargo, hasta ahora, la cirugía se ha interesado exclusivamente por las necesidades mecánicas inmediatas que cada instrumento ha debido cumplir en su aplicación específica. Precisamente, el principio de los anillos anatómicos, no es específico, sino general y por tanto, fecundo en el mejoramiento de la técnica. Mas que una invención, estos anillos anatómicos vienen a ser una corrección de los inaceptables anillos de nuestras pinzas y tijeras que molestan los dedos, dificultan y contrarían la ejecución y presición de los movimientos.

Quizá por esto mismo, por no haber ambicionado crear un instrumento personal, sino haber procurado subsanar un importante inconveniente de los instrumentos mas comunes, esta modificación de los anillos pueda atraer la atención de los cirujanos.

STRUMENTI DI ANELLI ANATOMICI

La Fig. 1 rappresenta un porta-ago Hegar-Mayo con gli anelli anatomici del Dott. Pietro D. Curutchet.

Gli anelli anatomici, larghi e bisellati d'accordo alla anatomía digitale, non molestano, ne stancano le dita; la superficie di contatto, tattile e chinestésica, é tre volte piú grande di quella dell'anello comune (Fig. 2). Per tutto ció, *proporziona una pressione* comoda, sicura e precisa, a favore della sutura. Gli anelli larghi e bisellati permettono prendere e lasciare lo strumento con facilitá.

Il presente modello é per la mano sinistra dell'autore.

Nel positivo benefizio della tecnica operatoria, *l'autore propone generalizzare il principio degli anelli anatomici* a tutti gli strumenti affini, pinze emostatiche, pinze intesti-

nali, forbici, clambs, ecc. Questa modifica non complicherebbe, ne rincairebbe la construzione. Il peso ed il volume degli strumenti non aumenta neanche, ne modificano la longitudine, né la forma dei rami di detti strumenti. Trattasi di una modificazione semplice ed afficace, ció nonostante, la chirurgia, fin'ora, si é interessata esclusivamente delle necessitá meccaniche immediate che ogni strumento ha dovuto riunir nella sua specifica applicazione.

Precisamente, il prinicipio degli anelli anatomici, non é specifico, bensí generale epperció fecondo nel miglioramento della tecnica. Piú che una invenzione, questi anelli anatomici rappresentano una correzione degli inaccettabili anelli delle nostre binze e forbici che molestano le dita, difficoltano e contrariano la asecuzione e precisione dei movimenti. Forse, perció, per non aver ambito di creare uno strumento personale, bensí aver intentato rimediare un importante inconveniente negli strumenti piú comuni, questa modifica degli anelli, puó attrarre l'interesse dei chirurghi.

NEUE ANATOMISCHE INSTRUMENTENGRIFFE

Fig. 1 stellt einen Hegar- Mayoschen chirurgischen Nadelhalter mit Dr. Pedro D. Curutchets anatomischen Griffen dar. Die breiten abgeschraegten, nach fingeranatomischen Angaben angefertigten Griffe sind bequem und ermueden die Finger nicht. Die fuehlbare und Bewegungskontrolle zulassende Kontaktflaeche ist drei mal so breit wie im allgemeinen ueblich (Fig. 2). Dies alles ermoeglicht die Ausuebung eines bequemen, sicheren und genauen Druckes bei der Anglegung der Naht. Die breiten und abgeschraegten anatomischen Ringe gestatten ein leichtes Ergreifen und Ablegen des Instruments. Das vorliegende Modell ist fuer meine eigene linke Hand angefertigt worden.

Im Interesse der chirurgischen Technik moechte ich das Prinzip der anatomischen Griffe fuer alle derartigen Instrumente wie haemostatische Pinzetten, Darmpinzetten, Scheren, Klemmen usw. bekannt geben. Eine solche Abaenderung macht die Instrumente nicht komplizierter und erhoeht nicht die Herstellungskosten. Das Instrument gewinnt weder an Umfang noch an Gewicht. Seine Laenge und seine Form aendern sich nicht. Es handelt sich um eine einfache, aber wirksame Modifikation.

Waehrend sich die Chirurgen bisher im wesentlichen fuer die mechanischen Grundlagen jedes einzelnen Instruments und deren spezifische Anwendung interessiert haben, so handelt es sich hier im Falle der anatomischen Griffe um ein allgemeines Prinzip, das auf die Verbesserung der heutigen Operationstechnik gerichtet ist.

Diese Griffe stellen eine Verbesserung der unmoeglichen Ringe an den gebraeuchlichen Pinzetten und Scheren dar, welche die Bewegungen schwierig und ermuedend machen und einer praezisen Anwendung hinderlich sind. Es bestand nicht die Absicht, ein spezifisches und persoenliches Instrument zu schaffen, sondern vielmehr eine Verbesserung einzufuehren und eine grosse Unbequemlichkeit auszuschalten. Ich habe die Erfahrung gemacht, dass dieser Vorschlag, wo immer vorgetragen, das unmittelbare Interesse jedes Chirurgen erweckt.

Turkish Chapter Meeting

The Turkish Chapter of the International College of Surgeons will hold the first of its scientific meetings on January 27, 1951, in Istanbul, under the direction of the President of the Chapter, Prof. Dr. Burhaneddin Toker and the Secretary, Dr. Dervis Manizade. Three such sessions will be held during the year.

Sección en Español

Un Nuevo Método de Prevenir el Émbolo Mortal

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ARTHUR C. JOHNSON, M.D., F.A.C.S., JOHN W. GATEWOOD, M.D., F.A.C.S.
OMAHA, NEBRASKA

PARECE casi increíble que la cirugía haya hecho tan grandes avances en conquistar los obstáculos que fueron responsables por una crecida mortalidad quirúrgica y que aún haya fracasado completamente en dominar el émbolo mortal. El Doctor Arthur W. Allen[1] del Hospital General de Massachusetts, en julio de mil novecientos cuarenta y nueve dió cuenta de que tantos émbolos mortales ocurrieron en el último año como en diez años pasados. Oschner[2] informó de una tendencia similar—en realidad sus cifras mostraron un aumento constante en los casos del tromboembólia y de los émbolos pulmonares y mortales. La ligación de las venas y terapéutica anticoagulante indubablemente han prevenido la muerte en muchos casos (especialmente en los que se ha dado advertencia por el émbolo no mortal.) La ligación profiláctica de las venas ha sido un fracaso completo, pues tantos pacientes mueren de los émbolos mortales después de la ligación como los que mueren sin ella. El levantarse pronto de la cama ha disminuído los casos de complicaciones post-operatorios, que son en su mayoría respiratorios y ciertos cardíacovasculares, mas en general no han decrecido esencialmente los casos de los émbolos pulmonares y mortales. Se ha hecho mucho para la posibilidad de pronosticar cuales pacientes son propensos al desarrollo de lesiones tromboembolías. Las obras de Oschner y Kay tocante a la concentración de globulina y los estudios de Takats[4] Sandrock y Mahoney[5] y otros, han ofrecido grandes avances en el desenvolvimiento de algún método de separar de los demás, a aquellos que serían víctimas de tales accidentes.

Una dificultad de seriedad reside en el hecho de que no hay manera de presagiar la muerte inminente por un émbolo. Verdaderamente, no hay uniformidad de opinión sobre el origen de tal émbolo. Los autores creemos que si es verdad que la mayoría de los émbolos provienen de trombos en las piernas, entonces algún método de determinar la presencia o ausencia de un trombo en esta situación sería de sumo valor. Los autores, en la actualidad estamos llevando a cabo estudios en que hacemos uso de células rojas señaladas para determinar la presencia o ausencia de trombos post-operatorios en las venas situadas profundamente en las piernas. Las células rojas que se administran al paciente antes de la cirugía están incubadas con P 32 (fósforo indicado). Puesto que la mitad de la vida del P 32 es de catorce días, hay tiempo adecuado para determinar el cuento Geiger en las pantorillas. Esto se hace antes y después y de la cirugía y antes y después de usar el Neumático Circulador.

No hay duda de que el mayor número de los trombos ocurre en las venas situadas profundamente en las piernas. Es hecho aceptado que aproximadamente el noventa por ciento de los émbolos pulmonares se asocian con los trombos en las venas de las piernas. Hay tantos elementos variables, que ha sido difícil probar que estos trombos representan un papel mayor en los émbolos pulmonares. Asimismo hay divergencia de opinión en cuanto al origen de los trombos. Parece improbable que éstos resulten como ocurrencia natural de muerte. Los autores creemos que presión hecha por medio de la isquemia en las pantorrillas, especialmente durante procedimientos de operación y en la fase de recobro post-operatorio durante el tiempo que hay ausencia de tono muscular, representa gran importancia en la etapa inicial de la enfermedad. Teniendo esto en cuenta, y las razones que apoyan tal contención, las cuales se enumerarán más tarde en este tema, los autores hemos ideado un método para prevenir la isquemia por presión y al mismo tiempo proveer artificialmente la continuación de activ-

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idad muscular durante un procedimiento de operación. El aparato usado para efectuar tal actividad muscular será descrito más tarde en este tema.

El crecido número de trombos ocurre en las venas situadas profundamente en las piernas, lo que se asocia con los émbolos no mortales y los émbolos mortales, apenas puede ser una coincidencia. Los rasgos siguientes parecen apoyar esta idea.

1. Ocurre crecido número de émbolos pulmonares y mortales en pacientes que han sido operados mientras estaban postrados en posición supina, especialmente en operaciones de larga duración y particularmente en las que se requería la posición Trendelenburg. Datos estadísticos por Barker, Hines y Allen[6] en los cuales señalan los casos de émbolos pulmonares y mortales, prestan peso a esta teoría, a pesar de que fueron publicados estos por otras razones. Ocurre gran número de émbolos pulmonares y mortales en largos procedimientos quirúrgicos,—tales como los de operaciones radicales del pélvico, los de operaciones de las mamas y los de resección del estómago, los cuales se hacen en las posición supina, mientras es menor el número de casos que se dan en las operaciones de corta duración—particularmente en las que se hacen con anestesia local, es decir, las operaciones de tiroides, y ciertas neuroquirúrgicas, etc.

2. En los pacientes que son intervenidos de ambas hernias femorales, los émbolos pulmonares resultan en 50% más de los casos que si se interviniese solamente uno de los lados. Lo mismo sucede cuando se interviene una o dos de las hernias inguinales. El único rasgo variable es el espacio de tiempo.

3. Son menores los casos que se dan de émbolos pulmonares en cirugía pediátrica. Más actividad, corto período de operación y peso disminuido de las pantorrillas—estos son elementos que tienden a decrecer la presión isquémica.

4. Los casos de émbolos pulmonares aumenta marcadamente en procedimientos operatorios en pacientes que pesan más de 200 libras.

5. Se dan menos casos de émbolos pulmonares en procedimientos en los que el paciente reposa en una posición lateral durante una operación.

6. Puesto que no hay suficientes cifras disponibles para comprobar lo siguiente, los autores somos de la opinión que hay mayor número de émbolos pulmonares post-operatorios en los casos de cirugía torácica en que el procedimiento se hace con el paciente postrado lateralmente. Creemos lo contrario en los casos donde los pacientes reposan en posición supina.

El retroceso de sangre por las venas al corazón depende de: (*1*) presión negativa dentro del tórax; (*2*) gravedad; (*3*) actividad muscular; (*4*) la ausencia de un obstáculo mecánico que evite el retroceso de la sangre. A menudo uno o más de estos elementos se alteran durante un procedimiento operatorio. El que más comunmente se impide es el de la actividad muscular, lo que ocurre como resultado de anestesia profundamente aplicada. La pérdida de tono muscular puede ser debido a la anestesia regional o general y la ausencia de tono puede perdurar por un período de tiempo variable. Nosotros creemos que si se pudiera estimular la actividad muscular normal y que si al mismo tiempo se pudiera remover la presión isquémica durante e inmediatamente después de un procedimiento operatorio, bien se podría prevenir el principal elemento etiológico que da principio al émbolo que marcha en misión de dar muerte al paciente. Se ha ideado un aparato para continuamente contraer y aflojar la musculatura de las pantorrillas y así liberarlas de la prensadura contra la mesa de operaciones. Una descripción de este aparato se ha dado previamente.

"El aparato siguiente fué diseñado para evitar prensadura prolongada con resultado de isquemia y para también producir los movimientos de compresión y aflojamiento que ayudan a la circulación en las piernas. Fué diseñado para funcionar simplemente, sin ruído, y automáticamente de tal manera que no sea molesto a nadie en la sala de operaciones. Igualmente fué diseñado para prescindir de motores y así minorar el peligro de encender gases explosivos. El aparato consiste en una vejiga de goma que se infla y que está construida para quedar a la forma del pie y de la pierna hasta llegar a la fosa poplítea. La vejiga es bastante grande para amoldarse a una pierna obesa o simplemente solaparse cuando se usa en una extremidad delgada. Los compartimien-

tos anteriores y posteriores amoldables al pie se relacional directamente con los compartmientos amoldables a la pierna por medio de un pequeño canal de aire.

El aparato fué diseñado así por dos razones: (*a*) para ayudar a la libre circulación de aire evitando angulación y desgaste en el sitio donde se amolda al talón; (*b*) para permitir el uso de tobilleras de sujeción en vez de un cinto más superior a las rodillas. Todos los compartimientos de ambas vejigas de ahí se relacionan por medio de un mecánismo pequeño. Este es de forma cilíndrica y mide 18 por 12 por 4 centímetros. El aire entra en el aparato de un tanque que contiene aire comprensado. Cuando el émbolo del cilindro llega a cierto punto una válvula permite el escape del aire. Esto produce "la expiración" del ciclo. "La inspiración" del ciclo ocurre cuando el émbolo del cilindro se mueve en la dirección opuesta. El número de ciclos que se efectua por minuto se puede regular facilmente por medio de una pequeña válvula situada en el extremo distante del cilindro o también por regular la cantidad de aire que entra en el aparato. No es necesario que haya muchos ciclos o recorridos, puesto que el própósito de este aparato es el de causar compresión y aflojamiento artificial de los músculos solamente tantas veces como sea necesario para prevenir éstasis de la sangre y presión isquemica. Hemos encontrado que un litro de aire por minuto produce aproximadamente 3 recorridos por minuto. Se necesita solamente una poca cantidad de aire. Los accesorios que se requieren son adecuados para cualquiera de los reguladores de tanques de oxígeno que se usan por lo común. La enfermera que atiende de la circulación es la persona más propicia para superentender el mecánismo, cuando éste ya se haya fijado a las extremidades del paciente. Después de esto, el aparato requiere poco o nada de cuidado. Nosotros creemos que este aparato es la solución para prevenir los émbolos pulmonares."

COMENTARIO

Varios elementos importantes fueron considerados en diseñar un aparato para remover prensadura y estimular la actividad muscular. He aquí los siguientes:

1. La presión debe ser eliminada de las pantorrillas.

2. Puesto que esto sea posible por usar varios aparatos de suspensión, un método debe utilizarse que produzca los movimientos de contracción y aflojamiento en las pantorrillas. Esto debe consistir simplemente en presión positiva y aflojamiento de retroceso en vez de succión o presión negativa. La presión negativa provoca la varicositis.

3. El aparato o la medida debe ser económica, y debe requerir poca o nada de atención.

4. Debe ser simple de construcción y sin motores electricos y el peligro de chispas que sean causadas por fricción; así se evita el peligro de encender gases explosivos.

5. Su actividad continua por largo tiempo no debe ser dañosa a los tejidos de la pierna.

6. El método o aparato debe aplicarse a la parte del cuerpo que es más propenso al desarrollo de los trombos.

Aunque en la actualidad no hay suficientes cifras disponibles, más del 70% de las complicaciones ocurre cuando no se emplea el Neumático Circulador.

CONCLUSIÓN

1. No se ha disminuido los casos de los émbolos pulmonares y mortales durante varias decadas pasadas.

2. Casi en total han fracasado los métodos empleados para evitar el émbolo mortal.

3. Un ensayo simple se está empleando para determinar la presencia o ausencia de trombos en las piernas después de la operación.

4. Un método previamente presentado se ha demostrado fructuoso en disminuir los casos de los émbolos pulmonares y mortales.

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Editorial

Membership in the United States Chapter of the International College of Surgeons

The second half of the twentieth century opens upon a period of great promise in the history of the International College of Surgeons. Never before has there been so strong and all-pervading an interest in the fulfilment of College ideals and the world-wide extension of College membership and facilities. A natural corollary of this interest is a quickening of desire for membership in the organization, and many questions arise concerning membership qualifications and the practical ways and means by which the College strives to perfect its achievements.

It is thought both fitting and expedient, therefore, to provide in this first issue of the *Journal* for the New Year a summary of membership requirements and a brief explanation of the processes involved in admission and certification in the United States Chapter, all of whose policies are, of course, established in harmony with the internationally basic principles upon which the College is founded.

Certification for Fellowship in the International College of Surgeons is based on an impartial determination of the candidate's qualifications, both personal and professional. In this country it is granted by authority of the International Board of Surgery of the United States Chapter. There are two ways in which an eligible candidate may become a Certified Fellow: (*a*) by a record of distinguished merit and (*b*) by examination.

To be eligible for Certified Fellowship in the United States chapter by merit, the candidate must be a citizen of the United States; a graduate of a medical school recognized by the Council of Medical Schools and Hospitals of the American Medical Association; a member of the American Medical Association and of the state and county medical societies, and a person of unimpeachable repute from the point of view of morality and professional ethics. He must have practiced surgery as a specialty, with distinction, for ten or more years. Fellowship in other surgical organizations or certification and/or membership of other certification boards will be evaluated and credited but do not obligate certification by the International College of Surgeons.

In other words, certification by merit is available to those whose records of achievement are such as to eliminate the necessity of examination. The need of a certain flexibility in this respect, strictly within the limits of the organization's high professional standards, early became apparent and was duly met by this form of certification. It was devised to fulfil an important need for those men who have already proved their value and as a formal recognition of their outstanding achievements in the field.

Eligibility for certification by examination includes all the requirements aforementioned (except the ten-year record) and the following additional requirements:

1. Completion of an internship of not less than one year in a hospital approved by the Council on Medical Education and Hospitals of the American Medical Association.

2. Surgical training of not less than three years in addition to his internship. This period of training may be spent (*a*) as a resident in surgery in a hospital approved by the Council of Medical Education and Hospitals of the American Medical Association; (*b*) under the preceptorship and/or direct supervision of a surgeon acceptable to the International Board of Surgery. Up to one year of this training may be in the basic medical sciences, or it may

consist of postgraduate study provided this covers the full academic year.

3. Submission of a properly compiled list of his scientific publications, accompanied with reprints if possible.

4. Submission of a complete record of all surgical procedures performed by him for at least one year prior to his application for Certified Fellowship.

5. Evidence that he has limited his practice to surgery or a surgical specialty for at least three years.

The *examination* for certification in surgery and its specialties includes (1) written and oral tests in the principles and practice of surgery, with emphasis on the subdivision or specialty professed by the candidate, and (2) examination in anatomy, physiology and gross and microscopic pathology, with emphasis on the clinical application of these sciences.

The *qualifying examination* is divided into Part I (written) and Part II (clinical). A card of admission is forwarded in advance from the Office of the Secretary, attesting that the candidate has given satisfactory evidence of all the prerequisites hereintofore listed, together with a notice of the date, place and hours of the examination, which covers a period of two days, with morning and afternoon sessions of three hours each.

All candidates wishing to qualify as Certified Fellows pay an application fee of one hundred dollars and a certification fee of twenty-five dollars.

Candidates recommended for certification by examination pay an additional examination fee of seventy-five dollars before taking the examination, and, if successful, the usual certification fee. The diploma fee is ten dollars, payable on notice of election. A Fellow's annual dues are twenty-five dollars per year, payable on January 1.

All payments are made by check payable to the order of the International Board of Surgery, United States Chapter, International College of Surgeons. Examination fees are refunded to candidates who for any reason do not take the examination as planned, but not in case of failure. A candidate who fails in the examination may apply for reexamination.

Recipients of certification by the Board are entitled to use the designation "Diplomate of the International Board of Surgery."

Any certificate so issued is subject to revocation by the Board if the candidate is proved guilty of misrepresentation of facts on his application or has become disqualified since its receipt through violation of the code of ethics of the American Medical Association.

Eligible candidates desiring to apply for examination may obtain the appropriate form by communicating with Dr. Karl A. Meyer, Secretary of the International Board of Surgery of the International College of Surgeons, United States Chapter, 1516 Lake Shore Drive, Chicago 10, Illinois.

Associateship and Junior Membership. — These two ranks of membership in the International College of Surgeons are two more examples of recognition of the need of flexibility to extend opportunity to those not yet ready for the rank of Certified Fellow.

Candidates for the class of Associate must be graduates of duly accredited medical schools or universities, must have served their internships and residencies or the equivalent in their several specialties, and must be of unimpeachable moral character. Both their qualifications and their professional records must be vouched for by at least two Fellows of the College or by three reputable surgeons in their respective communities. Every candidate for Associateship must be a member of the American Medical Association. Fellowship or certification in other surgical organizations is duly recognized and evaluated but, here again, in no way makes mandatory the candidate's admission to the United States Chapter of the International College of Surgeons.

The candidate for Associateship must submit a full copy of the records and hospital numbers of patients operated on by him during the year preceding his application. Reprints of any papers he has published should also be presented. The application fee for Associateship is one hundred dollars.

All Associates of the United States Chapter of the International College of Surgeons are expected to attend the annual Convocation. No diploma is granted to Associates, but an identification card is issued. Every Associate is expected, within five years of his election, to have made sufficient progress in surgery to

qualify him to apply to the International Board of Surgery for advancement to Fellowship in the organization.

The annual dues of the Associate are twenty-five dollars per year, payable on January 1.

Junior Membership, established to broaden the opportunities of deserving younger surgeons, is based upon the following requirements:

1. The candidate must be an American citizen and a graduate of a school of medicine approved by the American Medical Association.

2. He must have served one year's internship in a hospital approved for the training of interns and must present a letter from the Medical Director of the same.

3. He must be ethically, morally and professionally qualified for Junior Membership in the College.

4. He must show evidence of a surgical training program consisting of a minimum of two years' residency in surgery, or its equivalent, in addition to his year of internship.

5. He must submit a list of the operations he has performed or at which he has assisted.

6. His application for Junior Membership must be accompanied by a résumé of his professional training, two letters of reference and an application fee of five dollars.

7. On becoming eligible, the Junior Member is expected to make application for advancement to the International Board of Surgery.

No diploma is granted in connection with Junior Membership but an identification card is supplied to each accepted member. The annual dues of the Junior Member are five dollars.

The doors of the International College of Surgeons are wide open, as they have been from the hour of its foundation, to any qualified ethical surgeon who desires membership and can meet the organization's standards of character and skill. There is no distinction on any other basis; equal opportunity is offered regardless of race, creed and national origin. The very nature of the organization is a living denial of prejudice, a perpetual challenge to the enemies of scientific freedom, and a powerful deterrent to all influences that tend to cripple scientific education and the interchange of enlightened thought.—*Arnold S. Jackson*

THE ITALIAN CHAPTER OF THE INTERNATIONAL COLLEGE OF SURGEONS WILL HOLD ITS ANNUAL ASSEMBLY IN FLORENCE, ITALY

MAY 4 and 5, 1951

President of the Italian Chapter: Prof. Dr. Luigi Torraca, Professor of Clinical Surgery, University of Naples.

President of the Assembly: Prof. Dr. Antonio Comolli, Professor of Clinical Surgery, University of Florence.

Secretary of the Assembly: Prof. Dr. Gaetano Mangione, Assistant Professor of Clinical Surgery, University of Florence.

For complete information concerning the Assembly, please address the International Secretary General, 1516 Lake Shore Drive, Chicago 10, Illinois.

New Horizons

By the Editor

On Being Shelved

Webster defines a shelf as "a thin, flat, usually long and narrow piece of wood or other material, fastened horizontally at a distance from the floor, to hold objects." Other lexicographers agree, in all essentials, with this definition. Nor have we any fault whatever to find with it as it stands. Our objection is to certain proposed amendments, chiefly that which defines a shelf—tacitly, to be sure, but none the less insistently—as a repository for able and active men who, having reached an honorable maturity, are automatically to be retired in order to relieve their juniors of sharing the limelight with them.

This type of shelf, like its worthier predecessor, is thin and flat. It is not usually long and narrow but *un*usually long and narrow; its proportions, in fact, are unpleasantly suggestive of a sarcophagus. It also is fastened horizontally at a distance from the floor—in this case the floor of the arena; and its purpose, again, is to hold "objects." But there is a serious fault in its construction: It is not big enough to hold the "objects" for which it is designed. An able and active man consigned to a shelf is apt to prove a bit larger and livelier than the consignors anticipate. He is always leaping down again with an agility astounding in one of his age; and still more surprisingly he is often able to accomplish a good deal before he can be corralled and returned to the storeroom.

America, a young country, has always emphasized youth. But it is a mistake to emphasize anything without first defining it. Youth alone, chronologically speaking, is neither good nor bad; it is a purely arbitrary designation, invented for statistical convenience and classification. Any value inherent in youth must lie in some attribute peculiar thereto—freshness, curiosity, energy, glowing health, open-mindedness, courage or invention. All these qualities are often associated with youth, but by no means invariably. All these qualities are popularly supposed to decline with advancing years, but anyone with eyes in his head can see that they do not always do so. On the contrary, in many instances they go on burgeoning and spreading like the branches of an apple tree in spring, and the fruit grows richer and more plentiful every year. To accuse the tree of "dry rot" and cut it down is the act of a fool, and an extremely short-sighted fool at that. We may thank our stars that good men are hard to shelve, for, with so many capable juniors liable to the hazards of military service, the professional ranks at home would be dangerously thinned without the veteran campaigners of many years' experience.

No self-repsecting surgeon would continue in practice if he knew himself incapacitated in any way. The interest of too many others is involved. And shall a surgeon, accustomed all his adult life to facing the grimmest of realities, not be aware that virtue has gone out of him? He will be the first to know when it happens, and he will face that tragedy with the same outwardly cool though inwardly agonized resolution that has seen him through so many crises before. There will be no need of officious or ambitious hands to "shelve" him.

It is hardly worth while, perhaps, to point out the transparent self-interest and stupidity of trying to discredit the achievements of maturity on the single ground of maturity itself; persons capable of the attempt cannot see half an inch beyond their noses, or they would not be guilty of it in the first place. It is grimly amusing to see them reverse the charges as they themselves approach the danger line. Then their talk is all of the ineptitude of youth, its emptiness, its recklessness, its folly; and forthwith they set about, with all the energy of their earlier crusade, to put youth in its place and make it as difficult as possible for a youngster to get his foot on the ladder.

Fortunately, however, this preposterous blend of opportunism, self-interest and ill-directed ambition has not much power. In the first place, Heaven be thanked, most professional men are above it; in the second place, we repeat, retiring those who are not ready to retire is a good deal harder than it looks. Ability is not a matter of age, and this suffering planet is still able to accommodate more than it is likely to get.

Chapter News

Meeting of the House of Delegates United States Chapter International College of Surgeons

ARNOLD S. JACKSON, M.D., F.A.C.S., F.I.C.S.
SECRETARY, UNITED STATES CHAPTER

The meeting of the House of Delegates* of the United States Chapter, International College of Surgeons, was called to order by the President, **Dr. Custis Lee Hall,** at 2 p.m. on Oct. 30, 1950, in the Cleveland Hotel, Cleveland, Ohio.

Approximately two hundred attended this meeting, including many of the members of the United States Chapter whose privilege it is to attend the meetings of the House of Delegates.

The Minutes of the House of Delegates' meeting held on Dec. 18, 1949 were approved, after which the usual reports were made.

Report of the President (Dr. Custis Lee Hall): Dr. Hall welcomed the members of the House of Delegates and expressed his gratification at the fine attendance and his deep appreciation of the splendid cooperation given him during his tenure of office. He referred to the Presidential Address, presented by **Dr. Herbert Acuff** at the meeting of the House of of Delegates held on Oct. 13, 1945, in which Dr. Acuff stressed the importance of maintaining high standards in requirements for membership in the International College of Surgeons. Dr. Hall continued: "I am happy to state that, with the establishment of the International Board of Surgery in 1946, we have gone far. Not only have we conducted examinations in most of the surgical specialties, but we have established a reputation for honesty, integrity and the highest standards of examination for certification. We have also raised the standards not only by having Certified Fellows but by choosing men to become Associates who, in five years, will have the opportunity to qualify as Certified Fellows. The examinations conducted in Chicago at the Home of the College and at the Cook County Hospital have brought together a group of examiners who are doing excellent work."

Dr. Hall went on to stress the importance of the Conference Committee, functioning under the chairmanship of **Dr. William Carpenter MacCarty.** This Conference Committee investigates candidates of mature years whose surgical competence and ethical conduct have been established and who, during this personal conference, offer evidence of unquestionable qualifications. In these instances formal written examinations are waived. Dr. Hall then pointed out the fact that the creation of Junior Membership in the United States Chapter marked a step forward for the College and announced that at the Cleveland Convocation a class of fifty Junior Members, consisting of young surgeons who have "started on their upward course in the development of their surgical ability and training" would be admitted. He expressed his appreciation of the fine work which has been done by **Drs. Arnold Jackson** and **William B. Hobbins** of Chicago in organizing this group. Dr. Hall remarked that there are now one hundred and seventeen Regents and Vice-Regents in the United States Chapter and that, through the cooperation of this group, outstanding sectional meetings have been held in Tuscaloosa by the Alabama Section, in Los Angeles by the Southern California Section and in Denver by the combined Colorado and Wyoming Sections. He then spoke of the magnificent Home of the College and of the purchase of the mansion adjoining the original College property. He stated that plans are now under way for the

*The House of Delegates, as defined in the Constitution and By-laws, is composed of the Executive Council, the Board of Trustees and the Board of Regents.

best possible utilization of this additional space. He mentioned the outstanding work done by Dr. Herbert Acuff in connection with the Home of the College. Dr. Hall commented on the splendid growth of the *Journal*, not only in circulation but in type, scope, contents and influence. He then expressed appreciation to all of the officers, regents, vice-regents and members, saying, "I thank you sincerely for your splendid cooperation in the past two years in the attainment of the present high standard of the United States Chapter. I am sure that, with your continued cooperation and determination to foster the ideals of the College, we will establish ourselves even more surely as one of the greatest surgical organizations in the free world of today."

The President's message was accepted.

Report of the Secretary (Dr. Arnold S. Jackson): Dr. Jackson expressed his pleasure in the honor conferred upon him in his election as Secretary at the St. Louis meeting of the House of Delegates two years ago. He said that, although his predecessor had apprised him of the work entailed, he has found this office "a pleasant experience." "It has been an inspiring experience," he continued, "to work with so loyal, so friendly and so devoted a group of men—men who are always willing to make great personal sacrifices for the best interests of the College." He stressed the value of the friendship extended to him by the leaders of the College and stated that in his travels back and forth across the country he has been able to make many new friends. He pointed out that upon assuming his duties of office he had made several suggestions, which were readily approved by the Executive Council. He expressed his appreciation of the cooperation of the secretaries with whom the College had provided him.

Dr. Jackson remarked that his work as Chairman of the Program Committee was difficult during the first year because of the brevity of time before the Atlantic City Assembly but that, despite this handicap, a successful program was arranged. He expressed his appreciation to **Dr. Moses Behrend** for his cooperation and work in organizing the clinical day in Philadelphia during the Atlantic City Assembly, and to others for their wholehearted cooperation.

He spoke on the Cleveland Assembly and expressed great pleasure in having secured the cooperation of the Faculty of Medicine of Western Reserve University in supplying the lectures in Basic Sciences preceding the Thyroid Symposiums. He pointed out that the Assembly Program brought together a distinguished group of speakers in the field of goiter surgery and that three past presidents of the American Goiter Association participated in the Cleveland Program. Dr. Jackson pointed out the fact that he had assisted Dr. William B. Hobbins in organizing the Junior Membership group. In speaking of the growth of the United States Chapter, Dr. Jackson called attention to the fact that at the Atlantic City Assembly a urologic meeting was arranged and that out of that meeting a Section on Urology was formed. He expressed his hope that a Section on Obstetrics and Gynecology would be organized during the Cleveland Assembly.

In outlining the future activities of the College, Dr. Jackson stated: "From the experience I have so far acquired, it is my feeling that the College, in its tremendous growth of recent years, needs more than anything else to be welded more closely together. With this in mind, a Secretary's letter was recently sent to all Regents and Vice-Regents. In addition, space in the *Journal* has been devoted to news of various state and sectional meetings and to the membership."

In conclusion, Dr. Jackson expressed his appreciation "to the members of the Council for their cooperation and loyal support; to my assistants for their splendid help, and to the members for their enthusiasm and assistance." (Report approved.)

Report of Chairman of the Board of Regents **(Dr. Gilbert F. Douglas):** Dr. Douglas expressed his appreciation to the Regents and Vice-Regents, as well as the Executive Council, for the wholehearted cooperation he has received during the past two years, and to the members for their interest and suggestions. He spoke briefly on the various sectional meetings and their value in respect to the growth and development of the Chapter, emphasizing the fact that the Regents and Vice-Regents of each state are exceedingly influential in bringing about an increase of membership within

their respective states and stressing the importance of a well-knit organization within each state and the planning of sectional meetings throughout the country.

The reports of the Board of Trustees and the International Board of Surgery, presented by **Dr. Karl Meyer,** Chairman, were approved.

The following officers were elected for the period of 1950-1952:

President-Elect, Dr. William Randolph Lovelace, Albuquerque, New Mexico.

1st Vice-President, Dr. William Wayne Babcock, Philadelphia, Pennsylvania.

2nd Vice-President, Dr. Oswald S. Lowsley, New York.

3rd Vice-President: Dr. Louis A. Buie, Rochester, Minnesota.

4th Vice-President, Dr. Moses Behrend, Philadelphia.

5th Vice-President, Dr. Claude J. Hunt, Kansas City, Missouri.

Secretary, Dr. Arnold S. Jackson, Madison, Wisconsin.

Treasurer, Dr. Oscar B. Nugent, Chicago.

Member of the Board of Trustees, Dr. Elmer Henderson, Louisville, Kentucky.

The meeting was then formally adjourned.

Argentine Chapter

At a meeting of the Argentine Chapter of the International College of Surgeons, held in Buenos Aires on Dec. 27, 1950, the following officers were elected: President, **Dr. Jorge A. Taiana**; First Vice-President, **Dr. Augusto Wybert**; Second Vice-President, **Dr. Carlos Bergara**; Secretary, **Dr. Abel N. Canonico**; National Regents, **Dr. Alberto Baraldi, Dr. Delfor Del Valle, Dr. Carlos I. Rivas, Dr. Jorge A. Taiana** and **Dr. José M. Urrutia**; Corresponding Secretary, **Dr. José María Pelliza**, and Treasurer, **Dr. Roberto A. Goyenechea.**

Regents for Surgical Specialties were elected as follows: Gynecology, **Dr. Roberto Gandolfo Herrera**; Orthopedic Surgery, **Dr. Luis Weber**; Obstetrics, **Dr. Josue Beruti**; Traumatic Surgery, **Dr. August Wybert**; Thoracic Surgery, **Dr. Oscar Vaccarezza**; Neurosurgery, **Dr. Ramón Carrillo**; Plastic Surgery, **Dr. Hector Marino**; Surgery of the Abdominal Walls, **Dr. Ivan Goño Moreno**; Gastrointestional Surgery, **Dr. Abel Canonico**; Proctology, **Dr. Manuel Casal**; Surgery of the Liver, Pancreas and Biliary Passages, **Dr. Delfor Del Valle**; Surgery of the Endocrine Glands, **Dr. José A. Caeiro**; Urology, **Dr. Alberto Garcia**; Ophthalmology, **Dr. Ernesto R. Bernasconi Cramer**; Vascular Surgery, **Dr. Alfonso R. Albanese**; Otorhinolaryngology, **Dr. Antonio E. Carrascosa**; Oral Surgery, **Dr. Carlos Bergara**; Surgery of the Head and Neck, **Dr. Carlos de Nicola**; Surgery of the Spleen and Hemopoietic Organs, **Dr. Miguel Angel Etcheverry**; Surgery of Equinococcosis, **Dr. José Manuel Jorge**; War Surgery, **Dr. Raul N. Velasco**; Pediatric Surgery, **Dr. José Maria Pelliza**; Anesthesiology, **Dr. Roberto A. Goyenechea**; Radiology and Physiotherapy in Surgery, **Dr. Manuel F. Terrizzano**; Antiobioties in Surgery, **Dr. Enrique Savino**, and Experimental Surgery, **Dr. Arturo Martinez Borado.**

New Books

A History of Medicine. Vol. I: Primitive and Archaic Medicine. By Henry E. Sigerist. New York: Oxford University Press, 1951. Pp. 564, with 104 illustrations.

This is the first volume of a projected series of eight; a simple statement which becomes startling only after the reader realizes how much erudition and devoted study have gone into the first note of the octave. Dr. Sigerist, a research associate in medical history at Yale who in 1950 was awarded the coveted William H. Welch medal of the American Association of the History of Medicine, is a scholar indeed; yet he presents his great store of recondite knowledge in such a manner as to make it fascinting reading for professional men and laymen alike.

The volume covers primitive medicine and surgery in all its aspects, after which medical and surgical practice in ancient Egypt and Mesopotamia are thoroughly explored. The illustrations, most of which are grouped in a single section, are remarkable for their interest and variety. Mummies and skeletal parts with diseases still diagnosable are presented; a prehistoric apparatus for hydrotherapy is presented; there are charms, dolls and amulets for exorcising the spirit of disease, as well as effigies stuck full of nails and used in the infliction of disease or death upon enemies. A ceremony is pictured in which sickness was swept away with small brooms after ritual transference of the disease to fowls. A hideous statuette of the demon Pazuzu, purveyor of disease, is included, togethere with an elaborate diagram of the liver of a sheep as employed in prognostication.

If, as is to be expected, the remaining volumes of the series fulfil the promise of the first, Dr. Sigerist's work is destined to become a particular treasure in the libraries of those who value the human side of scientific development.

Sir Thomas Browne. By Jeremiah S. Finch. New York: Henry Schuman, Inc., 1950. Pp. 319. Illustrated.

Subtitled "A Doctor's Life of Science and Faith," this biography of the famous author of *Religio Medici* takes full account of the furore raised by this perennial classic among the ecclesiastics and laymen of its own time. It was an age in which theologians recognized no form of religion except the strictly orthodox, and Sir Thomas' liberal, if quaint, conceptions of the relation between man and his Maker were considered highly offensive if not actually heretical.

Liberal in the modern sense Sir Thomas was not, of course; he believed in witchcraft and subscribed to many misconceptions of nature and science current at the time. On the other hand, many other misconceptions universally accepted seemed to him absurd, and he did not hesitate to say so. The permanent value of his work lies ultimately in the fact that the seeds of liberal science were within him, and his limitations are ascribable to the genius of the age rather than to any deficiency of understanding in himself. In addition, he was master of a supremely engaging and memorable literary style, readable, reasonable and persuasive. Dozens of imitators emulated him, and there appeared books—most of them short-lived and now forgotten—dealing with the religion of every conceivable trade, profession and avocation. The present biography does full justice to his unforgettable personality.

Female Sex Endocrinology. By Charles H. Birnberg. Philadelphia: J. B. Lippincott Company, 1949. Pp. 134, with 30 illustrations.

Once again the human female is under observation, this time in the form of a restatement of a series of lectures given by Dr. Birnberg in a postgraduate course on sex endocrinology. The purpose, as quoted from the Foreword, was to manifest a "brief presentation of sex endocrinology" and to present "a discussion of the therapy most successfully used by the author in the treatment of sex endocrine disturbances." In fulfilling this purpose the author has been highly successful. The presentation includes a discussion of the hormones of the anterior pituitary gland and the hormones of the ovary; puberty and adolescence; diseases of the anterior pituitary gland; menstruation and disturbances of menstruation, ovulation; the climacterie; sterility; hirsutism; habitual miscarriage, and threatened abortion. In the form of a conclusion the author discusses laboratory procedures in endocrinology. Without claiming that his work is in any way definitive, Dr. Birnberg has submitted what he believes to be sound conclusions about every condition and anomaly peculiar to women, enhancing these conclusions by actual case histories and profitable illustrations. It is an invitation to increase one's own knowledge by sharing with the author his valuable experience in discovering and determining genuinely significant symptoms.

Anatomie Clinique et Operatoire. By J. Maisonnet and R. Coudane. Paris: G. Doin et Cie, 1950. 3 vol.; 2657 illustrations.

These three volumes on clinical and operative

anatomy are an excellent contribution to contemporary surgical literature. Anatomy being one of the foundations of proper surgical procedure, it is evaluated thoroughly in this work, as are modern operative technics. Descriptive as well as the topographic anatomy, physiology and surgical technic are amply discussed to give the reader a good comprehensive perspective of these particular phases of surgical endeavor as related to every region of the human body. This is augmented by succinct, pointed paragraphs on morphologic, pathologic and roentgenologic interpretation of the questions at issue and is completed by modes of surgical approach and technical details of the particular operative procedures. The authors have omitted bibliographic references, other matters that have "no practical interest," and questions still under discussion and not definitely established.

The work is illustrated with pen and ink drawings in the text, and although most of these are diagrammatic they illustrate the points well. A thorough knowledge of surgical anatomy is stressed by the authors. All in all, those who read French will find in this work a great deal of worthwhile material, which can be well recommended to the general surgeon, the specialist, and even the general practitioner who is desirous of marching along with the progress of modern medicine.

An Atlas of the Blood and Bone Marrow. By R. Philip Custer. Philadelphia: W. B. Saunders Company, 1949. Pp. 321, with 285 illustrations, 42 in color.

The important publication, a permanent contribution to the scientific library, is lavishly illustrated throughout with magnificent histologic photomicrographs, the magnification being as high in some instances as 2280. Many of these are in full color. The effect is striking indeed, and the accompanying text bears out the reader's expectations.

The book opens with a discussion of the hematopoietic system in general, proceeding therefrom to a study of disorders of the blood and bone marrow and their histopathologic manifestations. There is a highly interesting section on ill-defined types of anemia. Emphasis throughout the book is placed upon examination of sections as well as smears, since Dr. Custer ascribes an equal diagnostic importance to the two and is of the opinion that this fact has been somewhat neglected. His own contribution will inspire both interest and admiration.

Color Atlas of Pathology. Prepared under the auspices of the United States Naval Medical School of the National Naval Medical Center at Bethesda, Maryland. Philadelphia: J. B. Lippincott Company, 1950. Pp. 546, with 1,053 illustrations on 365 color plates.

As distinct from Dr. R. Philip Custer's *Atlas* (reviewed in this issue), the pathologic color atlas prepared by the Naval Medical School covers diseases of all the various body systems; and not all of the illustrations are photomicrographs, though all are in color. An equal interest is commanded and an equal importance observable in the photographs of patients with various diseases, though these are naturally fewer in a work on pathologic study. Clinical manifestations have great diagnostic importance to a trained eye, and color presentation, as has been mentioned formerly in connection with the fine work of Mr. Hamilton Bailey and others, is invaluable in showing the abnormal physical appearance in full detail.

According to a foreword by Rear Admiral Lamont Pugh, Deputy Surgeon General of the Navy, the principal object of this work is to supply the practitioner with "a comprehensive, concise and realistic source of reference . . . in the study and interpretation of both gross and microscopic" pathologic change. The objective has been more than satisfactorily achieved.

Skull Fractures and Brain Injuries. By Harry E. Mock. Baltimore: The Williams and Wilkins Company, 1950. Pp. 806, with 116 illustrations.

The book, written by a consulting surgeon who lays no claim to being a brain surgeon but has had for more than forty years a consuming interest in injuries to the head, is an earnest study of such injuries from the point of view of incidence, prevention and proper treatment. In justification of the project, Dr. Mock quotes Nicholas Senn: "There is perhaps no department in surgery in which the general practitioner should be more interested than in fractures of the skull.

Dr. Mock gives all due emphasis to statistics and their bearing on the future handling of head injuries. He discusses both clinical and physiopathologic manifestations; diagnosis and prognosis; treatment, both medical and surgical; the special requirements in treatment of children, and associated injuries and complications. His work is above all practical, down-to-earth and based as much upon common sense as upon an excellent foundation of technical knowledge. It should be warmly welcomed by those who, like himself, are called upon repeatedly to diagnose and treat conditions sometimes mistakenly supposed to be exclusively the work of one specialist or another; for they will find herein experiences and problems with which they have no small acquaintance, together with some admirable suggestions.

Abstracts from Current Literature

Rupture of the Pregnant Uterus by External Violence. Elias, M., M.R.C.S., Lancet **2**:253, 1950.

Rupture of the pregnant uterus by external violence is rare; only 3 cases were found in the English literature.

The author's case, a primigravida, aged 23 and thirty-four weeks pregnant, was admitted to the hospital half an hour after being involved in an accident on the river. She had been standing on the deck of a motor launch approaching a closed lock gate. She had been crushed between the bridge of the lock gate and the roof of the cabin of the boat.

Examination disclosed a laceration of the abdominal wall. At operation the fetus and the placenta were found lying free in the peritoneal cavity on the left side. The uterus was completely torn across at the junction of the upper and lower segments. The broad ligaments on each side were torn into. After ligation of the uterine arteries, the lower segment of the uterus was repaired with catgut in three layers and the stump of the uterus covered with peritoneum. Bleeding from the lower segment was arrested by suturing. The transverse laceration was next dealt with, the edges and lacerated fat being excised. The postoperative course was uneventful.

The fetus showed a fracture-dislocation of the cervical part of the spine. The lower segment of the uterus and the neck of the fetus were crushed between the lock gate and the promontory of the patient's sacrum, which was held against the cabin roof.

At the operation the fetus and the placenta were removed and the peritoneal cavity was emptied as far as possible of blood and clot with a suction apparatus. The fundus of the uterus was excised with the fallopian tubes, both ovaries being preserved by division of the ovarian ligament on each side.

The patient was discharged from the hospital in good condition three weeks after the operation.

GILBERT F. DOUGLAS

Blood Volume Determinations in Surgery: An Analysis of 100 Cases. Beling, C. A.; Bosch, D. T., and Morton, T. U., Surg., Gynec. and Obst. **90**:686, 1950.

Ordinary blood counts and hemoglobin and serum protein determinations usually do not reflect accurately the circulating hemoglobin and erythrocyte masses, the circulating plasma volume and the circulating proteins. Reduction of these circulating masses and volumes predisposes to operative and postoperative shock and influences convalescence.

One hundred consecutive major surgical cases are analyzed. In these a preoperative determination of the total blood, plasma, cell volume, circulating hemoglobin and proteins and total body proteins was made. Restoration of the deficient elements before operation and replacement of blood loss at operation was accomplished. It is believed that the volume tests are reasonably accurate clinically. A deficit of 500 milliliters of plasma volume in an adult is significant.

In patients with a total blood volume of 76.5 milliliters, a plasma volume of 40.5 milliliters, and a cell volume of 36 milliliters or less per kilogram of body weight, replacement of the deficit is mandatory. There was a significant deficit of blood volume in 75 per cent of the patients studied. Deficits ranged from 4,000 milliliters to zero in the 100 cases in this series. There was no trouble due to overloading the vascular system even though slightly more than the deficient elements often were replaced.

Replacement of blood volume deficits preoperatively and blood loss during operation have almost eliminated postoperative shock and has widened the scope of surgery. Postoperative convalescence has been rapid in patients thus treated as compared with the slow recovery of many not receiving the benefit of replacement.

J. O. MORGAN

Anlage Tumors of the Salivary Gland Type in Unusual Sites. Bella Halpert, Victor C. Hackney, Surgery **27**:609, 1950.

Anlage tumors of the salivary gland type are usually in or near the parotid or submandibular glands and occasionally in the sublingual glands, but may occur anywhere along the line of fusion of embryonal facial fissures. About twenty of these neoplasms have, however, been reported as occurring in sites distant from the head. Ten of these were on the fingers and hands, two on the forearm, three on the lower extremities and one each in the inguinal region, the vulva, over the sternum and in the mammary gland.

The authors suggest that since these neoplasms are found in distal locations their development is probably not dependent on proximity, to salivary glands. They report 3 cases in which the tumors were near the eyes and 3 in which they occurred on the trunk, 1 being over the sternum, 1 in the breast and 1 on the back.

It is suggested that the derivation of these tumors is from embryonal rests of the ectoderm, the anlage separating before the cells have acquired their dominant characteristics as ectodermal or mesodermal cells. All of these tumors are benign, though at times they may become locally invasive.

VICTOR T. HUDSON

Headaches and Head Pain of Ocular Origin. Ruedemann, A. D., J.A.M.A. **144**:517, 1950.

Ocular headache makes itself evident in the evening after a day's work and tends to pass off when the patient rests his eyes. The headaches occur most frequently in "run down" persons, in women during late pregnancy in adolescents and in young persons whose work requires constant use of their eyes. It is important that these patients be given muscle balance tests along with the careful eye examination. Every child must be checked before entering school.

Types of ocular abnormalities causing unilateral head pain are (*a*) ciliary spasm, (*b*) spasm of a single ocular muscle, (*c*) localized neuralgia, (*d*) inflammation of the gasserian ganglion, (*e*) irritation of an internal carotid artery by an aneurysm and (*f*) malocclusion of the temporomandibular joint. Glaucoma of any type may produce severe pain. It is wise in certain instances to advise the removal of blind and useless eyes. Bilateral head pain may be ocular in origin, but glasses are not always indicated.

Frontal headache may be due to (*a*) esophoria, (*b*) hypermetropia, (*c*) anisometropia or (*d*) hyperphoria. Occipital and suboccipital headache is due to convergence insufficiency. Radiating pain to the shoulders and arms may be due to convergence insufficiency or hyperphoria. Cervical pain may be present because of ocular muscle imbalance.

CLAUDE M. WARREN

Excretion of Potassium after Partial Gastrectomy. Wilkinson, A. W.; Nagy, G.; Billing, B. H., and Stewart, C. P., Lancet **2**:135, 1950.

The authors made a study of potassium excretion with 5 patients who underwent partial gastrectomy for duodenal ulcers. Before and after operation the nitrogen balance was studied, the intake of sodium and chloride controlled and the potassium measured.

Before operation, on an intake of about 3 gr. of potassium daily, there was a small positive balance. After operation the potassium intake was nil for one to four days and then gradually restored to the postoperative level, which was regained in four to seven days postoperatively. For one to three days after operation the daily total quantity of potassium rose above the preoperative level in spite of the absence of any intake. During the succeeding five or six days the daily urinary excretion of potassium was reduced even though its intake had been resumed. On about the seventh or eighth day after operation both the intake and the excretion of potassium had returned to the preoperative level. The immediate postoperative increase in potassium excretion is in sharp contrast to the coincident decrease in excretion of sodium and chloride which occurs in spite of an increase in the intake of these ions.

The widespread nature of the electrolytic changes in the immediate postoperative period is evidence against the view that there is a destruction of tissue with liberation of potassium from the destroyed cells and consequent excessive excretion of potassium. The most likely source of this temporary excess of potassium is the intracellular fluid. In the early hours after injury an inflammatory exudate forms in the damaged tissues. This results in an acute demand for fluid containing protein and electrolytes. The demand is satisfied primarily from the plasma, which in turn leads to the withdrawal of extracellular fluid from uninjured areas. The withdrawal of extracellular fluids causes a widespread disturbance in the extracellular-intracellular fluid balance. Consequently water and electrolytes pass into the extracellular spaces from the cells. The chief intracellular cation is potassium. The excessive potassium concentration of the extracellular fluid is passed on to the plasma resulting in an increased excretion of potassium in the urine.

In the author's opinion further precise measurements are needed to establish the hypothesis, but it is worth pointing out that it is consistent with various clinical observations.

J. O. MORGAN

Meigs's Syndrome. Beresford, O. D., and Aidin, R., Lancet **2**:211, 1950.

A definite clinical syndrome was not established until 1937, when Meigs and Cass reported 7 cases (4 of their own and 3 others.)

Ascites and hydrothrax have also been observed with tumors other than fibroma of the ovary.

The authors report the case of a 77-year-old married woman on whom a paracentesis abdominis was done. Five litres of yellowish fluid removed prior to laboratory, at which a malignant neoplasm of the ovary was discovered.

The cause of the effusions is not known, and various theories have been brought forward to explain them. Selye's alarm reaction (1936) has been suggested as the mechanism responsible. This hypothesis suggests that the effusions are the result of an irritant which produces a hypersensitive state (in the present case a pelvic tumor), but it does

not explain why only some pelvic tumors produce the syndrome. Dockerty and Masson (1944) observed that edema of the tumor and/or the pedicle appeared to be related to the ascites, which was absent when there was no edema.

GILBERT F. DOUGLAS

Blood Test for Cancer. Black, M. M., Rev. Gastroenterol. **17**:481, 1950.

Black reports a specific serologic test for cancer. This is based on a decreased ability of the serum of cancer patients to reduce methylene blue. He reports on a series of cases in which the test was evaluated.

There was an overall identification accuracy of 89 per cent. Complete extirpation of the carcinoma will be followed by alteration of the test to normal within seven to ten days.

However, the reactions are not entirely specific. Cirrhosis, pregnancy and other conditions produce similar changes. Further statistical evaluation will be necessary to assess the value of this test.

M. T. FRIEDELL

Evaluation of the Black Test as a Screen Test for Malignancy. Nadler, S. B., and Gordon, S., South. M. J. **43**:204, 1950.

Nadler and Gordon present an analysis of data obtained from the Black test on 1,760 patients, 247 of whom had proved malignant disease. Approximately 75 per cent of these had correct positive Black reactions, but in 60 patients there were false negative reactions.

Of patients without known malignant disease, approximately 78 per cent had a correct negative black reaction, and the remainder apparently had "false positives." Of course, it cannot be proved that some of these patients did not have malignant disease.

M. T. FRIEDELL

Diagnosis of Multiple Ocular Muscle Paralyses. Knewson, W. E., J.A.M.A. **144**:534, 1950.

The author presents an excellent discussion of the diagnostic procedures needed to determine which ocular muscles are paralyzed. These procedures include the Maddox rod and screen tests, duction and version tests, the study of diplopia fields, pass pointing and head tilting.

Confusing factors leading to uncertainty in diagnosis are discussed. The most commonly encountered types of multiple paralysi are also discussed and are well worth studying in detail.

CLAUDE M. WARREN

Cyst of Patent Urachus. Getz, R. J., and Thomas, D. E., U. S. Armed Forces M. J. **1**:436, 1950.

Getz and Thomas present a case of a patent urachus in a 30-year-old man. This is a relatively rare condition. The urachus is situated between the transversalis fascia and the peritoneum and is lined with stratified squamous epithelium. It is rarely more than 5 cm. in length and approaches the umbilicus only under abnormal conditions. The distal termination of the urachus at the bladder is covered by a transverse fold which prevents the entrance of urine. The majority of instances of urinary drainage from the umbilicus are not due to urachal anomalies but to failure of closure of the upper end of the bladder. It is suggested that a more specific term, vesicoumbilical fistula, be applied. The incidence is subject to question because of improper diagnosis. Four main pathologic types are noted: 1. Complete—patent throughout from bladder to umbilicus. 2. Blind external end—patent at the umbilical end only. 3. Blind internal end—patent at the vesical end only. 4. Blind end—cyst the most common type. The diagnosis is usually not made unless infection occurs. Low abdominal pain and tenderness are the most common complaints. Frequently a suprapubic mass is palpable. The diagnosis is not easy but is facilitated by cystoscopic, cystographic and roentgenographic study. The treatment is always surgical and consists of incision, drainage and excision.

WALTER M. KEARNS

Reconstruction of Index Finger with Nail Transplantation. Berson, M. I., Surgery **27**:594, 1950.

Anyone who has suffered the loss of a thumb or an index finger can testify that restoration would be of prime importance. This article summarizes the principles involved in restoring a forefinger, transplanted toenail and pedicle graft in which was placed a cartilage implant.

The flexor and extensor tendons were attached to the pedicle graft. This permitted flexion of a 90-degree angle and complete extension.

There was no loss of sensation in the skin of the finger stump. The V incisions used in fashioning the finger pedicle junction provided good surface attachment, good blood supply and elasticity of the skin.

The cosmetic results were extremely gratifying, because the transplanted fingernail remained viable. Langer's lines on the pedicle closely paralleled those of the finger stump. There was consequently inappreciable cosmetic textural change.

HARVEY E. BILLIG

Armamentarium

Information on Electron Microscope: A brochure describing and explaining the new RCA electron Microscope, type EMT, has been released by the Scientific Instrument Section of the RCA Engineering Products Department. Twelve pages in length and profusely illustrated, the booklet demonstrates the utility of this table model electron microscope in hospital laboratories, schools and various industrial fields. It contains full particulars as to operation and performance. Diagrams and photographs explain the principles of electron optics and electron microscopy. Requests for this brochure should be addressed to Department 521, Engineering Products Department, Radio Corporation of America, Camden 2, New Jersey.

New Phosphatase Substrate: The Sigma Chemical Company of St. Louis is preparing p-nitrophenyl phosphate SIGMA, a phosphatase substrate recommended in the diagnosis of rickets, hyperparathyroidism and diseases of the liver. In the presence of these conditions the phosphatase content of the serum is extremely important and may be the most satisfactory index for detecting the deficiency. Studies of these diseases require a rapid method of determination of the phosphatase content of small amounts of serum. It is claimed that with this new preparation fifty to one hundred analyses may be accomplished in two hours, only 0.005 ml. of serum being required for each. The method is recommended for both macrodeterminations and microdeterminations and for either acid or alkaline phosphatase and is said to offer a considerable saving of time as compared with methods using glycerol phosphate and phenyl phosphate as substrates. The compound is colorless, but when the phosphate group is split off the yellow salt of p-nitrophenol is liberated. This salt has an absorption maximum of 400 mμ, so that the substrate acts as its own indicator of phosphatase activity. Even the blank correction can be read from the same sample.

New Monochromator: The Cambridge Thermionic Corporation of Cambridge, Massachusetts, offers a new monochromator as a simple source of monochromatic light. The device utilizes the rotary power of quartz. According to the distributors, it eliminates the cumbersome arc light and prism arrangement, yet gives a beam of higher intensity. Collimated light from a tungsten filament lamp will yield adequate illumination at all wavelengths in the new monochromator because of the large light aperture available—a full inch.

In the quartz monochromator, white light from a tungsten source is passed through basal sections of optical quartz laminated to polaroid sheets. By a synchronous rotation of the quartz sections, the wave length of transmitted light can be varied continuously through the visible spectrum. The instrument produces an average band width of 150 Angstrom units. An adjustable support is provided for tilting the monochromator in line with light source and the microscope or other apparatus to be used.

Inquiries should be addressed to: Cambridge Thermionic Corporation, 517 Concord Avenue, Cambridge 38, Massachusetts.

Outline of Chemical History: An outline of the history of chemistry, which is expected to have permanent value for practicing chemists, students and teachers, will be made available within a few days by the Mallinckrodt Chemical Works of St. Louis. The detailed and comprehensive outline starts with the pre-Christian origins of chemistry in India, China and Egypt and traces the evolution of the science up to the present time.

The outline, which is in the form of a flow sheet, consists of two charts printed side by side on a sheet of paper measuring 35 by 35½ inches. The first chart opens with the remote beginnings of the chemical science, moves into medieval alchemy, the chemistry of combustion, pneumatic chemistry, the beginnings of organic and biologic chemistry, etc., and ends with the work of Lavoisier. The second chart continues the story through the beginning of the era of synthetic organic chemistry, the discovery of the elements, the modern concept of valence and molecular structure, etc., ending in 1950 with the elements Berkelium (97) and Californium (98).

The hundreds of entries on the two charts are arranged chronologically, with interconnecting lines to indicate relationships between men, theories, laws and discoveries. The outline is printed in four colors, which are used to identify the main streams of chemical history. An index of names, with birth and death dates, increases the usefulness of the charts.

Bordering the outline itself are illustrations of early equipment and laboratories (Agricola's Glauber's, Becher's, etc.,). On the back of the outline are portraits of early chemists prominent in the development of analytical chemistry (Paracelsus, Hoffman, Lavoisier, etc.); five examples of the accomplishments of modern analytical chemistry (in the manufacture of synthetic rubber, in the development of the atomic bomb, alloying metals in steel, etc.); and milestones in the development of many laboratory chemicals, invention and use of Bell Closure bottles, steady expansion of its system of distributors, etc.).

In Memoriam

HAROLD D. CORBUSIER

M.D., F.I.C.S.

The recent passing of Colonel Harold D. Corbusier at his home in Santa Fe, New Mexico, not only deprived the International College of Surgeons of a valuable member but wrote "finis" to a highly distinguished career. A veteran officer of four campaigns—the China Relief Expedition in 1900, the Philippine campaign in 1901-1902, the Mexican Border campaign in 1916 and World War I in 1916-1919, Dr. Corbusier made memorable contributions to the achievements of the Army Medical Department. During World War I he organized the Section on Orthopedic Surgery of the Surgeon General's Office under General Gorgas and formulated the first special order for the establishment and conduct of courses of instruction for newly appointed orthopedic surgeons. Some of his most important work was done in connection with "manpower salvage" and was based upon his firm conviction that men with moderate physical defects were or could be made fit for military service. His success in this connection led to the further development of the work at Camp Meade, where his rehabilitative procedures became famous under the general name "The Camp Meade Method." At the same station Dr. Corbusier organized and commanded a 2,000-bed emergency influenza hospital; manded a 2,000-bed emergency influenza hospital.

Dr. Corbusier's entire professional life, indeed, was marked by steadily successive achievements of note and the honors they so well deserved. He was well known as president or past president of many professional groups, as an author on subjects in his field, and as the inventor of several Army devices that proved greatly advantageous to the service. He was a member of the Association of Military Surgeons, the Academy of Physical Medicine of the United States, the American Medical Association, the Military Order of the World Wars, the Board of Trustees of the National Society for Crippled Children, the International College of Surgeons, and many other organizations both professional and social. A man of geniality and widely diversified human interests, Dr. Corbusier leaves many sorrowing friends behind him, both within the College and without it, to say nothing of the grievous loss to surgical science represented by his death. The warmest sympathies of the International College of Surgeons are tendered to his bereaved family.

EDUARDO BORGES DA COSTA

M.D., F.I.C.S. (HON.)

Prof. Dr. Eduardo Borges da Costa was born in Rio de Janeiro on February 5, 1880 and died on September 6, 1950. Dr. Borges da Costa was Professor of Surgical Clinics in the Faculty of Medicine of the University of Belo Horizonte, and Dean of the Surgeons of Minas Gerais.

On August 1, 1950, Dr. Borges da Costa was made an Honorary Fellow of the Brazilian Chapter and, during the Seventh International Assembly at Buenos Aires, he was awarded an Honorary Fellowship in the International College of Surgeons.

During the First World War, in recognition of services rendered as surgeon in the Hospital "Val de Grace" in Paris, Dr. Borges da Costa was made a Knight of the Legion of Honor of France. Other honors received in recognition of his work during the First World War include: Medal of Officer of the Academy of Paris; Officer of the Order of Leopold I of Belgium; Victory Cross and War Cross received from the Brazilian Government. Dr. Borges da Costa was a Colonel Doctor of the Reserve of the Second Line of the Brazilian Army.

STEPHEN SANTANGELO

M.D., A.I.C.S.

On June 7, 1950, Dr. Stephen Santangelo, 51, of Jersey City, New Jersey, died of a heart attack after a short illness. Dr. Santangelo received his medical degree from Temple University School of Medicine. He did postgraduate work at the New York Postgraduate Medical School and Hospital, the New York Polyclinic Hospital and Medical School and the Cook County Graduate School of Medicine, serving his internship at the Jersey City Hospital. In the capacity of attending surgeon, Dr. Santangelo was affiliated with the following hospitals: the Jersey City Medical Center; the Hudson County General Hospital; the New York Postgraduate Medical School and Hospital, Columbia University; the Private Service Jersey City Medical Center, and the Jersey City Medical Center. From 1934 to 1942 he taught Operative Surgery and Colon and Rectal Surgery at the New York Postgraduate Medical School and Hospital. His practice was devoted to general surgery.

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and the

UNITED STATES CHAPTER

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CALENDAR OF MEETINGS

May, 1951

21-25.....Société Internationale de chirurgie orthopédique et de traumatologie
Stockholm
Dr. J. Delchef
34, rue Montoyer, Brussels

July, 1951

International Society of Blood Transfusion
London
Centre national de Transfusion sanguine
6, rue Alexandre Cabanel, Paris
M. Bernard Rouzet

September, 1951

3-7.....International Anesthesia Research Society
London
Mr. R. W. Cope
University College Hospital, W C 1
London, England

11-14.....United States Chapter, International College of Surgeons
Palmer House, Chicago
Dr. Arnold S. Jackson
1516 Lake Shore Drive
Chicago 10, Illinois

October, 1951

1-6.....Congrès de l'Association française de Chirurgie
Paris
12, rue de Seine, Paris 6ème
Prof. Brocque

Congrès francais d'Oto-Rhino-Laryngologie
Paris
Dr. H. Guillon
6, avenue MacMahon, Paris

December, 1951

American Medical Association Clinical Session
Dr. George F. Lull
535 North Dearborn St.
Chicago 10, Illinois